THE IRON TRADE REVIEW

VOLUME XXVI. CLEVELAND, O. FEBRUARY 9, 1893. CHICAGO, ILL. NUMBER 6.

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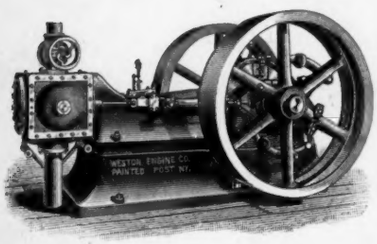

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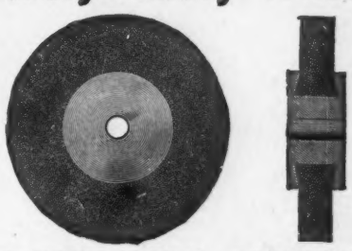

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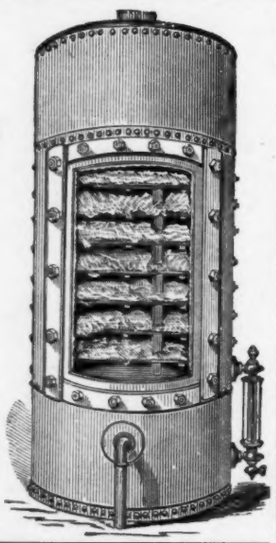

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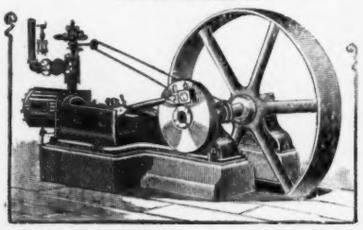

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THE IRON TRADE REVIEW

VOLUME XXVI. CLEVELAND, O. FEBRUARY 9, 1893. CHICAGO, ILL. NUMBER 6.

THE WEEK IN IRON CIRCLES.

GENERAL FEATURES.

January is gone and one-third of February, with expectations of a strong buying movement "after the turn of the year" still unrealized. There has been buying, to be sure, in the last fortnight, enough to make a round aggregate, when the reports from all primary markets are taken together, but makers of raw iron are not satisfied with prices. Furnace firms that went into the new year determined to hold to the prices of December, held off for a time, while presumably weaker firms did the cutting, but there is now no denying that concessions can be obtained from the largest sellers. With the unsettling of prices, there has entered into the situation a slight feeling of uncertainty due to the embarrassments which have been chronicled and to the necessities of other firms indicated by the extremely low prices some of them have been making. Yet the record of last year speaks well for the financial condition of the business, taking it through and through, one large pig iron selling firm whose business aggregated $7,000,000, reporting that the total of losses to furnacemen on the year's business was less than one-fiftieth of one per cent. The statistics for Feb. 1 are not yet available, but are likely to show an increase of stocks, a situation that may not change until the spring is well advanced. Prospective demand for finished material is large. In steel rails there is a better outlook. The Pennsylvania company has recently placed an order for 60,000 tons and the Northwest will be in the market for considerable tonnage within a few weeks. The big Chicago elevated railway contract aggregating $3,000,000 taken by the Carnegie Co. and the iron for the Chicago & St. Louis Electric railway mean heavy mill tonnage in that description of material. Naval construction contracts in the East have added their share, and there is a large amount of bridge and building work in prospect for the Spring that promises an active structural market. Present prices are in the main no improvement on those of a week ago.

THE CLEVELAND OUTLOOK.

Several factors in the shipping situation, as it begins to take shape in the minds of marine men, combine to give them confidence that freight rates will be maintained at a fair figure. In the first place, unless there is an exceptionally early spring, the ice in Lake Superior and in the Sault will be much longer clearing than usual, the severe winter more completely locking up the lakes than has been the case for years. The navigation season is thus likely to be a short one. Another effect of the hard winter is the rapid dwindling of coal supplies at upper lake ports, and the probability that there will be a much larger transport of coal out of Lake Erie ports next season, than has been known in several years. The extra time required in loading and unloading coal would leave the ore freight market that much shorter of tonnage. A third point made by vesselmen is a staple one—the large and increasing stores of grain at the head of the lakes, much of which will be on the freight market when navigation opens. But these questions only prospectively agitate ore firms. It will not be comfortable for the ore seller to be crowded on the one hand by the vessel interest, asking freights close to the rates of last year's season contracts, and on the other hand, by furnacemen insisting on material reductions from the ore prices of '92; but that is his position, prospectively, from this outlook. There are chances, however, that the waiting attitude of furnacemen may put a large share of the ore sales so far into the shipping season that buyers will have to share in the advanced freights that may then be an actuality. Sellers of Bessemer ores will be interested in the recently developed situation in the East. Furnacemen there who have been supplying themselves with imported ores, on the hand to-mouth plan, find that they must look to Lake Superior Bessemers, in the sudden withdrawal of the ocean freights that have favored them for some months past.

Pig Iron. The Cleveland market in raw iron has been almost lifeless from the beginning of the year. Foundries that had bought supplies to run them to the first of January seem to have had more than their output called for up to that time and not many of them have reentered the market as yet. Prices have not weakened in the past 10 days, because there was no lower notch. The attitude of certain Valley furnaces in refusing to go below $13 at furnace for Bessemer has had some slight effect on the market, Pittsburg prices being a trifle stronger than was the case a week ago, $13.20 @ 13.40 more accurately representing later transactions. Forge iron has seen a slow market in the past few weeks and there is reported a transaction of 10,000 tons of gray forge at a price delivered at mill that would net the furnace $11.50. It need not be said that all-ore iron cannot be made in the valley at that figure. Mill cinder must be a prominent element in irons sold on any basis like the above.

Finished Iron, etc. There is still a fair run of inquiry for all kinds of mill products. Prices show no improvement, and the anxiety of mills to keep their order books a few weeks ahead of operations has been apparent in more than one contract for bar iron and for structural products. A good specification finds mills still ready to sell bar iron on the 1.45c. basis. Inquiries for early spring contracts indicate that an unusually large amount of construction work will be done. Prices on beams and channels, plates and angles show no improvement, but sellers, who have had to meet some keen competition from the East, of late, are not making any deeper cuts, and are inclined to look for better figures in the near future. In the old material market there is little inquiry, and steel has more attention than iron.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Quite a large business was done in the last week, in pig iron, principally in local coke irons, of which there were two or three lots sold reaching into the thousands of tons. Southern coke and Lake Superior charcoal were both very quiet, sales made being small and only for immediate use. Prices obtained were very satisfactory upon the whole, though charges of cutting continue to be made. Several large buyers are in the market for quotations, but it remains to be seen whether they will close large orders or not. It is hardly expected by the dealers that they will sell any lots longer than 200 or 300 tons in the near future, though one or two of the inquiries may develop into sales of larger amounts.

BAR IRON.—The market on bar has been quiet, with sales of only small amounts. Quotations are unchanged at 1.60c Chicago.

BILLETS AND RODS.—Very little of consequence has been done, and prices are unchanged. Billets, $24; rods, $32.50.

RAILS AND TRACK SUPPLIES.—A moderate buying continues in rails and track goods, with unchanged prices. Rails, $30 to $32; track bolts, 2.65c to 2.70c; spikes, 2.05c to 2.10c.

STRUCTURAL IRON.—The recent heavy weather has largely reduced the demand for structural material, but prices are well built up for quotations: Beams and channels, 2.25c to 2.50c; angles, 2.05c to 2.15c; sheared plates, 2.10c to 2.20c; tees, 2.40c to 2.50c.

PLATES, TUBES, ETC.—Business transacted has reached a fair volume, and the demand for boiler goods is excellent. Tank plates, 2c to 2.10c; shell steel, 2.30c to 2.40c; fire box steel, 3.75c to 4c; flange steel, 2.55c to 2.65c; tubes, discount 62½ per cent.

SHEETS.—There is no change to report, either in situation or price. The demand for black sheets is fair, and quotations 2.85c. Galvanized sheets are selling only slowly at last quotations—70 and 7½ per cent. at the mills, and 65 and 10 per cent. to 70 per cent. from store.

MERCHANT STEEL.—Quite a large buying movement is reported from the implement trade, and quotations are unchanged: Open hearth spring, 2.35c to 2.40; tire, 2c to 2.15c; machinery, 2.20c to 2.25c; crucible spring, 3.60c; machinery, 4.75c; tool steel, 6½c and upwards; Bessemer bars, 1.80c to 1.90c.

OLD RAILS, SCRAP, ETC.—Only a small business is reported, with unchanged prices. Old rails $18.50; old wheels, $14; old steel rails, $11 to $15; No. 1 forge, $14; No. 1 mill, $9; turnings, $7.50; mixed steel, $9; coil steel, $12; leaf steel, $14; low tires, $14.00.

GENERAL MARKET RESUME.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. There is no question that bottom has been touched in prices of raw iron in the past ten days and it was only natural that there should be the slight reaction which the past three or four days have shown from the low depth to which the market had gone. Sales of Bessemer at $13.10 have been reported in the midst of the demoralization, and it is probable that the reports of $13, in a few cases, are correct. But the majority of Bessemer-selling furnacemen are now holding for an advance and $13.20 to $13.30 is the basis of current transactions, with a tendency toward the $13.50, Pittsburg, which is still the minimum figure with some valley furnaces. Foundry iron has been in only moderate demand, with $14.25 @ $14.50 for No. 1 as the basis. In forge iron there is an accumulation of stocks and this has led to some low quotations. While $12.25, Pittsburg, is still generally held to, there are known to have been Valley transactions 15 cents better than this. But indications are that these unprecedented quotations will not long be available. It is plain that all-ore mill irons are not made at a profit at the figures that have ruled and that mill cinder must enter more and more into the iron on the market, with current figures as the basis. In general, it is to be said that holders of pig iron are less inclined to sell freely than they were a week ago. There is more activity in some lines of manufactured iron. The Pennsylvania road has placed orders for 60,000 tons of steel rails, in the week, and it is expected that other purchasers will come into the market. Steel billets are not active and quotations range from $21.25 to $21.50. Muck bar is only a nominal factor in the market, and sales are made at $24.25. Old iron rails are quoted at $19.50; the old material market continues weak.

Cincinnati. The conditions of the iron market remain weak and unsettled. Transactions are slowly increasing in volume, but there is no strengthening of prices. Statistically, the situation is strong enough, but sentimentally it is weak. So far as can be seen, there is no material curtailment of consumption by foundries or mills. Complaint of light trade is heard in some quarters, but the actual melt keeps up about to its normal proportions. If there is no further falling off, a more liberal buying movement must begin soon. Money remains easy at most centers, but there is no lowering of rates. Generally the range of prices for iron during the week has not changed compared with the week previous.

St. Louis. There have been several good sized orders placed during the past week for Southern irons at prices ranging fully 25 cents below what the majority of the Southern furnaces are asking. The foundries all seem to be fairly active, and are not placing their orders for very large amounts of iron, as the cutting of prices that has recently been going on has weakened their opinion of the market, and they are now waiting to see how low prices will go.

Louisville. There is a strong feeling that it will be necessary for lower prices to be made, and buyers claim that concessions have been made on all grades; No. 1 foundry being offered on basis of $10.50, Birmingham, and grey forge at $8 50, and a number of transactions have gone through on that basis. Consumption is going forward on a large scale, and buyers have not been carrying stocks to a great extent, but they have felt that the market was in their favor and have declined to purchase heavily, so that by delaying it has forced some furnaces who wished to make sales to offer inside prices. This has succeeded in demoralizing the market to an extent that buyers are unwilling to purchase unless concessions can be obtained, and furnaces whose position was strong enough to hold prices without change may have to meet the cuts. The indications are that $8.50, Birmingham, or less, for grey forge will prevail for some little time to come. Car wheel irons are not in large demand, and prices have fallen off slightly.

Buffalo. While prices still continue weak, inquiry is rapidly going on, and some good sized sales are being consummated. Consumption is apparently growing and forcing purchases. The present demand for iron, if continued, will certainly stop further decline in prices, if indeed it does not cause a sharp advance.

THE United States Rolling Stock Co.'s plant at Marion, O., is to be sold under foreclosure on a $1,203,000 judgement.

THE IRON TRADE REVIEW

DEVOTED TO
IRON ORE, IRON AND STEEL MANUFACTURE, MACHINERY TRANSPORTATION, INDUSTRIAL PROGRESS, STATISTICAL INFORMATION, ETC.

PUBLISHED EVERY THURSDAY BY
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FEBRUARY 9, 1893.

THE NEW SHEET METAL GAUGE.

The bill to establish a standard sheet and plate gauge has been reported favorably to the House by Chairman Stone, of the Committee on Coinage, Weights and Measures, and it will require only the formalities of transit through the House and Senate to make it a law. The interests which it most concerns are practically united in its support and there is no obstacle apparent now to its speedy passage. The diversities in existing gauges and the confusion these have occasioned are familiar to all of our readers who have to do with the manufacture or the purchase of iron plates and sheets. One gentleman who appeared before Chairman Stone's committee gave as an illustration of the uncertainty and injustice in business transactions prevailing under present conditions, that in a single contract he had made, two gauges could be selected that would be $40,000 apart. The Amalgamated Association worker, basing his idea of his wage contract on the New Birmingham gauge, would lose nearly a quarter of his wages if settlement were made, for example, under the Brown & Sharpe gauge.

The basis of the gauge recommended to Congress in Chairman Stone's report is so natural and so convenient to remember and to use, that there will be no question of its general adoption. It has for its basis the fact that a cubic foot of iron weighs 480 pounds, this being also the basis on which the imperial gauge of Great Britain rests, and the New Birmingham and Amalgamated Association gauges. A one-twelfth section of this cubic foot of iron would be one foot square and one inch thick and would weigh 40 pounds or 640 ounces. A sheet weighing one ounce would be one foot square and one 640th of an inch thick.

The scale has been arranged so that each descriptive number represents a certain number of ounces in weight and an equal number of six hundred and fortieths of an inch in thickness. Thus No. 0000000 is one-half inch, or 320-640 inch, thick and weighs 320 ounces per square foot; No. 000000 gauge is 15-32, or 300-640, inch thick and weighs 300 ounces per square foot; No. 27 is 11-640 inch thick and weighs 11 ounces per square foot. Chairman Stone adds, in his report:

A micrometer for measuring the thickness of sheets and plates can be constructed to indicate six hundred and fortieths of an inch as easily as one-thousandths, and thus the measurement of a sheet of iron will give the thickness in six hundred and fortieths of an inch in weight in ounces at the same time. It is probable that the adoption of this gauge will gradually lead to the abandonement of the numbers and the use of the number of ounces in weight per square foot as the descriptive terms of the different thicknesses of sheet and plate iron. It will become as easy to order a 20-ounce sheet as a No. 22, or a 10-ounce as a No. 28, and this will cause a more general and intelligent comprehension of just what is being contracted for, and the opportunity for mistake or fraud growing out of an uncertainty of designation will be removed. A natural consequence also will be the substitution of such weight designation for the arbitrary methods now in vogue of describing tin and terne plates as IC, IX, IXX, DC, DX, etc,

At the suggestion of the American Society of Mechanical Engineers the equivalents in thickness and weight, in terms of the metric system, have also been incorporated in the bill, these being simply matters of computation. It will be understood, of course, that the new gauge is not compulsory, but the bill provides that on and after July 1, 1893, it shall be used in determining duties and taxes levied by the Government on sheet and plate iron and steel. There is little question that its adoption in the trade will date from its passage by Congress.

MARINE ENGINES ON LAND.

The adoption by the Edison Electric Illuminating Co., of New York, of multiple expansion engines for its power station, is an important step in engineering. The objections to the usual type of engines, which started the company on investigations resulting in this step, were the great space required for the engines they had in use, and their heavy vibrations. When it is stated that a plot of ground large enough for the company's power station at Elm and Pearl streets cost $300,000, the necessity for economizing every foot of space is apparent. And when there were added to this the complaints of residents near the station of the quaking of their houses by reason of the heavy vibrations, a remedy had to be sought. It need not be said that there was strong expert opinion against the introduction of the marine engine, but Chief Electrician Van Vleck went to work upon a modification of the multiple expansion type, and between Mr. Van Vleck and the engineer of the manufacturing company, at Scranton, there has been produced what they have called the "Van Vleck disconnective engine."

The first engine made has been put in the Elm street station of the Edison Electric Illuminating Co. and two others have been placed in the 26th street power station. Mr. Van Vleck is thus quoted relative to the change:

"We have effected this revolution in engineering against the strongest and most persistent opposition. We are now beyond the experimental stage, and the marine engine is on shore to stay. Our new engines are all of the multi-expansion, inverted cylinder marine type. By placing the steam chests on the front instead of between the cylinders, the engines are made 30 per cent. shorter than other types; and, coupled with direct-driven dynamos, the longer units occupy only about one-tenth of the space required for electrical generating under old conditions.

"The regulating and valve gear is also placed on, and operated from the front of the engine. The valves are 'positive' avoiding any change in point of cut-off produced by valve friction. The speed of the engine can be varied while running. The engines are calculated for an initial pressure of 200 pounds of steam per square inch, and they can be used either condensing or non-condensing.

"One triple-expansion engine of 1,250 horse-power is also running at the Elm street station. We will not build any more triple-expansion engines, but will make them all of the quadruple-expansion type. Engines of this type are in use on the steamships Buenos Ayres and Montevideo, and are producing the most efficient results.

"We have made room in the Elm street station for 10 quad-

ruple-expansion marine engines, costing $50,000 each, and of an average of 3,000 horse-power apiece. This will give us, in this limited space, about 30,000 horse-power, sufficient for 300,000 incandescent lights. We count one arc light as being equal to ten incandescent light.

"The land engine takes up ten times as much space as a marine engine, and the marine quadruple-expansion engine had ten times the heating surface of the land engine. The new quadruplex two-crank expansion engines will be twice as powerful as the triple-expansion three-crank engines, and will occupy 30 per cent. less room. The new engines will carry regularly 210 pounds of steam. The land engine carries only 80 or 90 pounds of steam. The land engine gets one horse-power out of from 4 to 10 pounds of anthracite coal. The quadruple-expansion marine engine will develop one horse-power out of 1½ pounds of anthracite coal or out of 1¼ pounds of Welsh coal. In other words the land engine requires from two to four times as much coal as the marine engine to produce the same power."

The predictions of failure made for the experiments described above were based on the claim that for the marine engine on shore too high a steam pressure would be required. But the Edison company assert that they have gone beyond the stage of experiment and that the marine engine is on land to stay. The move is certainly an important one and the claim of the multiple expansion engine to be classed as amphibious will be a live topic for discussion in steam power literature for some time to come.

IRON AND STEEL IMPORTS IN 1892.

The iron and steel section of the Treasury Department's summary of the imports and exports of the country in the year ending Dec. 31, 1892, contains several interesting points. In general, the imports of iron and steel were considerably less in 1892 than in 1891. The total value of these imports, excluding ore, was $33,352,965 in 1892, against $41,540,935 in 1891, a falling off of about 20 per cent. Yet, in a number of lines, though values were less, quantity was greater, prices being considerably lower. The imports of tin plates, terne plates and taggers tin are conspicuous for the lower values in 1892, indicating to what extent the Welsh manufacturers have cut their profits, under the McKinley tariff act. The difference is indicated in the following figures:

IMPORTS OF TIN PLATES, TERNE PLATES AND TAGGERS TIN.

	1892.	1891.
Quantity	600,819,566 lbs.	734,455,267 lbs.
Value	$17,105,475	$25,900,305

That is to say, while the tin plate imports of 1891 were 22 per cent. greater in 1891 than in 1892—a fact of significance, by itself—the values in 1891 were more than 52 per cent. greater than in 1892. Who paid the tax, when the Welsh manufacturer had no American competition?

The iron ore imports for 1892 were 12 per cent. less than in the year previous—806,585 tons against 912,856 tons. In 1890 the amount was 1,246,830 tons; in 1889, 853,573 tons. The total for last year was the smallest in four years, and with the exception of 1888, the smallest since 1885.

Pig iron imports increased from 67,179 tons in 1891 to 70,125 tons in 1892; bar iron, from 40,541,719 lbs. to 43,191,218 lbs.; hoops and ties for baling purposes, barrel hoops, and hoop or band iron or steel, flared, splayed or punched, from 417,550 lbs. to 2,265,079 lbs.; hoop, band or scroll iron, from 1,534,832 lbs. to 1,635,462 lbs.; sheet plate and taggers iron or steel, from 26,616,550 lbs. to 60,390,088 lbs. Ingots, blooms, billets, etc., decreased from 77,694,547 lbs. in 1891, to 68,512,730 lbs. in 1892; wire rods, from 105,140,344 lbs. to 95,032,695 lbs.; wire, and wire rope and strand, iron and steel, from 9,852,141 lbs. to 8,580,505 lbs.

CLEVELAND CHAMBER OF COMMERCE.

Cleveland's Board of Trade is no more. But Cleveland's Chamber of Commerce, incorporated Feb. 6, by the action of one of the largest meetings held on the Board of Trade in years, means larger effort for the commercial and industrial advancement of the greatest vessel-owning port on the Lakes and the leader, in many lines, of the manufacturing cities of the country. The Board of Trade, in its early days, performed the functions of a produce exchange; its day of usefulness in that line has gone by, and the fact that it had not fully covered the field that opens before the new Chamber of Commerce is evidenced by the growth of the Cleveland Board of Industry, that has been pushing for the expansion of the city's manufactories for the past ten years, and the organization, more recently, of the Merchants' and Manufacturers' Club, to look after freight rates and prevent discriminations. These two organizations will now be merged in the Chamber of Commerce. Instead of the 464 members of the Board of Trade it is proposed to have 1,000 members of the Chamber of Commerce, and the $20,000 in the treasury when the change took place is to be the nucleus of a building fund, to be raised through $100 subscriptions by 1,000 persons or $200 subscriptions by 500 persons. The new building will probably be located close to the Public Square and will be made the center of the city's business and industrial life. No step taken in years means so much for Cleveland, and the unanimity with which the vote was given is a prophecy of united action that will be productive of the largest results. With a live Chamber of Commerce, owning its own home and its work in the hands of a pushing secretary, Cleveland will take a long stride toward her destiny as a great shipping and manufacturing center.

It is apparent by this time, doubtless, to the most radical defenders of the Homestead strikers' outbreak of last July, that courts of justice are not good germinating or propagating places for the misty semi-socialism that sprouted in some of the Congressional speeches on Homestead. The following passage from the Associated Press report of the trial of Clifford, one of the rioters, at Pittsburg, last week, for the murder of Conners, a Pinkerton detective, is in point:

Attorney Erwin, whose defense of Critchlow created such a sensation, arose to make an explanation of his conduct in that case, but was not permitted to do so. Judge Stowe informed him that if one-tenth of what he (the judge) had heard of the Critchlow trial were true, he would permit no such actions on the part of Mr. Erwin in this case.

During the cross-examination of Captain Cooper, Judge Stowe stopped the attorneys for the defense who were seeking to show that the Pinkertons were trespassers at Homestead. The judge said: "I won't allow such questions. These men were going to Homestead on a lawful errand and had a right to go. These rioters had no business there. Even if the Pinkertons had been going there to take that mill by force they were justified in doing so, and no one has a right to dispute it in this court and you may as well understand that just now. Such ideas as you attempt to advance never have been the law, are not the law, and I hope never will be the law. It is anarchistic to advance such sentiments and I will allow no one to advance such ideas here."

Canadian appropriations for canals need to be kept constantly in sight, by way of "stirring up the pure minds" of Washington legislators to the demand for per-

sistent pushing of the project for an all-United-States water route, 20 feet in depth, from Duluth to the seaboard:

OTTAWA, ONT., Feb. 2.—The Dominion estimates for the ensuing year contain appropriations of $4,330,200 for canals. The items include the following: Sault Ste. Marie canal, $1,906,000; Soulanges canal, $1,000,000; St. Lawrence river and canals, $250,000; Cornwall canal, $530,000.

FORECASTS—whatever they are worth—agree that 1893 will be a year of large consumption of iron and steel; they agree, also, that the markets do not indicate this state of things as yet, and are not likely to do so in the immediate future.

A BESSEMER DEMAND AT THE SEABOARD.

TO THE EDITOR OF THE IRON TRADE REVIEW:

At this time, when demoralized prices are causing our miners much perplexity, it may be instructive to look at the situation affecting foreign Bessemer ores. Lulled into a feeling of security by the seemingly never-to end perio l of low freights, Eastern furnacemen have supplied their wants from hand to mouth, until now that ocean tonnage is withdrawn from the market they are brought suddenly to face the much higher range of freights upon which new business must be predicated, with small stocks on hand. Our London cables daily report, "No tonnage offering," and in this connection a recent letter from a well informed correspondent makes important reading:

"It needs no gift of prophecy to predict a substantial rise from such a scale of freights as rules just now the world over. Ship owners have been living on short commons for a long while, and their constantly deteriorated constitutions are breaking down altogether now that things are below starvation point. Vessels have been laid up in rapid succession as they arrived home; indeed, the most ridiculously low freights have been accepted from the Mediterranean ore ports to the United Kingdom in preference to others for America which look better on paper, simply and solely because the former enable the steamers to discharge somewhere in the neighborhood of the buoys to which they are going to be tied up until better times. You may see rows of them in this position at most of our ports now, and they will be receiving daily recruits as long as freights stay where they are. We should not be surprised to see somewhat of a jump in grain freights from your side; and if it is really a jump, and not a small hop, we expect boats will go in ballast for the grain. It is not worth while to waste the time over the three-cornered voyage anywhere in the neighborhood of the coal and ore freights now offering to and from the Mediterranean. Under all these circumstances we think you will agree with us that any increased demand for ore on your side means an appreciable increase in freights."

Certainly 50,000 tons of foreign ore at prices which have ruled for the past 18 months would be readily taken in the East to-day, but business has come to a stand-still for lack of tonnage at former rates, and any pressure to effect charters would probably be followed by an immediate advance of 50 cents to 75 cents per ton. The conclusion points to very small importations for some time to come, with Eastern consumers forced to look westward for replenishment of stocks. Yours very truly, ENNIS & Co.

PHILADELPHIA, PA., Feb. 4, 1893.

Pittsburg Mills Fairly Well Employed.

The iron and steel trade in the Pittsburg district is gradually picking up and most of the mills are now doing a pretty good business. They are not generally running to their capacity, though, and in many instances the number of men employed has been considerably reduced. The demand, though, is better than a month ago, and mills are running more regularly than then. Jones & Laughlins have put their entire plant on double turn. The change was made without much of a protest from the men. The blast furnaces in the district are busy as only 2 of the 26 are idle. The one at Soho has not been in blast since October, 1891. The owners say they are waiting for an advance in price. D Furnace, No. 3, of the Carnegie plant at Braddock, is idle because it is being repaired. These furnaces are all being repaired and relined in regular order. During January, furnaces of the Carnegie Co,, produced 75,000 tons of Bessemer pig, which was all used at its steel works. Of this, 30,000 tons weve turned into steel rails and the rest into structural steel and billets. The other 13 furnaces in blast in the district turned out 2,500 tons making 150,000 tons produced during the month.

At Lindsay & McCutcheon's Allegheny mill more than 100 puddlers are idle. Olivers' puddling department at the Southside mill is still idle, no work having been done for nearly two months. The mill at Kittanning has been started after a two month's idleness, while 250 ovens have been fired to supply fuel for the Rebecca blast furnaces, which were put in blast last week. The Millvale mill was running during the past week, but much trouble is being experienced from the furnaces, which have been standing idle so long. After an idleness of two days, they will again be fired Tuesday, and a steady run is expected to be made. In most of the mills the orders are filled as received, little stock being kept on hand.—[Pittsburg Dispatch, 6th.

On the Editorial Table.

Notable among calendars which have come to our table are those of Merchant & Co., Philadelphia—an elaborate piece of lithograph work, with a marine view prominent; of the Vulcan Iron Works Co., of Toledo, O., showing, by the aid of a clear-cut engraving, the "Little Giant" steam shovel at work on the side of a cliff and the "Giant" railroad excavator at its base; and of Wm. Reisinger & Son, of Baltimore, Md.

Premising their remarks with a reference to the relation of "volume of business" to "fixed charge," the Gobeille Pattern Co., of Cleveland, in a novel communication to the trade, make the assertion that they do more business than any three pattern shops in the country. To any concern desiring in a practical way to dispute this, they make the proposition that each deposit $1,000, and that sum is to be divided among three charitable institutions, the company receiving the award, from a committee whose selection is provided for, getting back its $1,000 check. The whole affair is quaintly gotten up on two leaves tied with ribbon and sealed with a great seal—an original and taking advertising conceit.

American Society of Naval Architects Formed.

At a meeting held Jan. 31, at the rooms of the Society of Mechanical Engineers, New York, a new organization was founded, known as "The American Society of Naval Architects and Marine Engineers." The motion for its incorporation was made by W. H. Jaques, ordnance engineer of the Bethlehem Iron Co., and after the adoption of a constitution and by-laws, permanent officers were elected. Clement A. Griscom, of Philadelphia, president International Navigation Co., was made president, and Theo. D. Wilson, of Washington, chief constructor U. S. N., first vice-president, and W. L. Capps, of Washington, secretary and treasurer. J. F. Pankhurst, of Cleveland, is a vice-president. The society will correspond with the British Institution of Naval Architects. It is intended to embrace in its membership the prominent representatives of all classes of shipping interests in the United States, both naval and commercial. More than 400 members have already been enrolled.

Personal.

Mr. Charles G. Eddy has resigned the vice-presidency of the Norfolk & Western Railroad to become second vice-president of the Philadelphia & Reading Railroad, vice Charles Hartshorne, who will be made third vice-president in place of Robert H. Sayre. The latter becomes fourth vice-president, and Mr. J. R. Young, at present fourth vice-president, will be made fifth vice-president. Mr. Eddy will have general supervision of the traffic department.

Mr. Albert Fisher, who has been for some time Western manager of the Ball Engine Co., will take charge of the Chicago agency recently established by the Watertown Engine Co., of Watertown, N. Y. The latter company has put upon the market a new high-speed engine.

E. P. Williams, of Cleveland, has been elected assistant secretary of the Brown-Bonnell Iron Co., of Youngstown, O. W. S. Taylor is secretary.

THE Akron (O.) Gas & Oil Co. is leasing land near Ravenna, O., and will go down 4,000 feet, if necessary.

LAKE SUPERIOR COKE-MAKING.

TO THE EDITOR OF THE IRON TRADE REVIEW:

At various times in the columns of your paper, articles have appeared bearing upon the subject of coke-making upon Lake Superior; and in the person of Mr. E. C. Pechin, of your city, the opponents of its success have had a champion. I would that some one directly connected with coke manufacture or its consumption, at the head of the lake, had undertaken to give the facts relative to this work and its success to the public, rather than myself; but having a lively interest in this question for the benefit of Marquette, and having recently returned from a visit to the industrial works operating at West Superior and Duluth, I beg to lay before those interested some facts that probably are not as well known as they should be.

It is an admitted fact that Connellsville coal weathers when exposed to atmospheric agencies. This has never been denied by those favoring the manufacture of coke away from the coal mines. On the other hand, the amount of such loss has never been definitely or accurately determined, and it must necessarily vary for different districts subject to varying conditions. That this loss is so great as to preclude the employment of home-made coke, if I may be allowed the term, for metallurgical purposes, I very much doubt.

The nearest approach to a settlement of this point is the fact that the Lehigh Coal & Iron Co., of West Superior, Wis., have been making coke in bee-hive ovens from Connellsville coal, and obtaining an average yield of 62 per cent. of coke, which has been used with satisfaction, both in furnace and cupola practice. From this same coal, if freshly mined and coked on the ground, we know that the Eastern operator would obtain a yield of 65 to 66 per cent. of coke, or a difference of three to four units. But what is of concern to Marquette, as a coke-making and consequently coke-iron-producing point, is whether this difference of three to five per cent. is a drawback sufficiently serious to overcome its other natural advantages in the way of cheap freights, wonderful variety of cheap iron ores and advantageous geographical position, and is a question that will be dealt with in a subsequent letter.

Referring to your issue of Dec. 29, 1892, containing an extract from an article by Prof. J. W. Langley, relative to the enormous loss in foreign coals from weathering, we find the following: "I have found in experimenting with our Pittsburg coals that they suffer loss, even when kept in porcelain dishes in the laboratory of the university, but that if the surrounding air is *perfectly dry*, no apparent loss takes place at ordinary temperatures; on the other hand, the air in its ordinary state contains moisture enough to cause the slow wasting of the fuel, and if the coal is kept wet, the change is quite sensible."

It is quite evident that moisture is a determining factor in the breaking down of a bituminous coal, and, consequently, humid atmospheres are more energetic in causing the oxidation of the coal than those carrying a minimum of moisture; and it is possible that the well known dryness of the air of the Lake Superior region has an important bearing upon the commercial and technical success of coke-making in this vicinity. At all events, it is reasonable to suppose that the drier the climate the better the chances are for the coal remaining in a satisfactory condition to coke; it is possible that this is one of the reasons why coke can be made *at all* upon this lake.

In a recent issue of *The Iron Trade Review*, Mr. Pechin guardedly states that, from the evidence given in a late trial between the Lehigh Coal & Iron Co. and the West Duluth Furnace Co., the blast furnace of the latter company came to grief by reason of their using locally made coke, and then proceeds to call the attention of the public to the lamentable result. The facts are that the furnace had not been running satisfactorily for a few months previous to the shut-down; there were accretions upon the sides, and the furnace was working through a hole; the single blowing engine was in sad need of repair, but it could not be stopped; however, the furnace ran on, and during the month of February worked fairly well, and it seemed as if matters were being straightened out for a successful run. In the meantime the furnace was making a good yield upon the *coke made from coal that had been stored since the previous fall.* The succeeding month, however, brought the culmination of troubles. The rings for setting the packing out of the steam piston of the blowing engine were worn out, and the bolts in the air piston were stripped of their threads. Thus the engine was rendered useless. In addition to these troubles, the iron was working its way through the sides of the crucible, owing to defective fire-brick; in fact, I saw a mass of ten or twelve tons, which had come through the lining, that was removed by the present operators. Without air the furnace could not run, and its failure must not be charged to quality of the coke.

It must be admitted that in the present state of the art, we in this country have not succeeded in making a good coke from poor coal. The coke that was furnished the furnace company, while it may have come from the Connellsville bed, was of poor quality. It may have come from mine pillars; it may have been exposed to weathering long before reaching the head of the lake; or it might have come from the bed, where by its topographic and stratigraphic positions, it may have been seriously affected. We know that coal subject to some of these conditions has been shipped to market, and that it makes a poor, very poor coke. And until it is proven that the coke delivered was made from the best of Connellsville coal, there will be a missing link in the chain of evidence, and no fair-minded or unbiased person would condemn coke-making on this shore, on such a showing. For the continued success of operation located in this vicinity, care and watchfulness will be needed to insure the best grade of coal being sent from the mines to the ovens, and the handling of the ovens entrusted to an experienced, trustworthy and competent man; for here again is a possible source of trouble. The best coke is made in ovens having a high initial heat, and if by reason of quenching or other cause they become cooled, the succeeding charge of coke is apt to be below standard grade. This is one of the precautions that has to be drilled into coke drawers, as owing to the heat, when drawing the ovens the temptation is to deluge the coke with water. And yet, in spite of this and other theoretical drawbacks, the Lehigh Coal & Iron Co. furnished a satisfactory grade of coke at times; this implied irregularity may with propriety be charged just as much against the method of handling the ovens, as the quality of coal used in coking.

As a proof of the quality of some of the coke made, it is well known that for a period of six months a cupola running about sixty tons daily melted on an average ten pounds of metal per pound of coke. This is not cited as exceptionally good work, but to illustrate the *fact* that a commercial and satisfactory grade of coke has been made. Taking one thing with another the above record is equal to the general practice elsewhere in this character of work.

We have been told that Connellsville coal cannot be sent to this lake and made into good coke. We have not yet sufficient evidence that that statement is true. Many of us believe otherwise. If the New River fields of West Virginia are to be of service to us (and we sincerely hope they may) we must get a railroad rate from that State to some Lake Erie port that will compete with that from Connellsville to such port. If it can be satisfactorily demonstrated that this coal can be shipped as cheaply, that it will stand transportation as well, and yield as good or better coke than its older competitor, then we will gladly welcome it, and I doubt not, use it. It will doubtless replace an amount of Connellsville coke now being brought to the Ohio Valley, Chicago and elsewhere, and to that extent will relieve the Pennsylvanian ovens. In this way it may benefit us, by throwing more Connellsville coal on the market and possibly lowering its price.

There is another phase of this coke-making in this locality that offers food for some thought. We are living in a progressive age, and there has been in this country at least very little if any advance in our methods of coking coal or utilizing the waste heat (*not* gases necessarily) or in the saving of bye-products. In Europe there are several furnaces reported to be in successful operation. At the Calumet Iron & Steel Co., near Chicago, in 1889, some experiments were made in what they called Hall ovens, in which they attempted to cool the coke by injecting crude petroleum or naphtha into the furnace, and in that way they increased the yield in gas and even somewhat increased the yield of coke, but they did not make as good a coke as when they do not seek to produce a large amount of gas. Should there be a mechanically feeding and

drawing oven in successful operation, I would be glad to hear of it from some disinterested party.

We cannot save our gases to use for steam or heating purposes, and also retain them in the coke. What we may do, however, is utilize the waste heat of the ovens, if the beehive type is adopted, for steam making. In and around a rolling mill, there is an enormous quantity of coal used for this purpose alone, and, if only a portion of the steam plant can be operated by the wasted heat, to that extent is there a saving effected. At the coal fields this heat is entirely wasted. Here by having the ovens contiguous to the furnace or mill plant, there is no question but that a very large and important saving can be effected, without in any way adversely affecting the continuance of the several operations of coking and steam making.

If, then, coke can be made of a satisfactory quality, at reasonable cost—say *not to exceed* $5.50 per ton, with our unlimited quantities of iron ores of all kinds and grades, why should not this port of Marquette offer advantages worthy of investigation to iron and steel manufacturers. With cheap Lake Superior ores, and coking plant operated in connection with the furnace and mill, with railroad facilities, one of the finest harbors on the lake, the conclusion is inevitable that this field must be occupied, and the one that first embraces this opportunity for locating here will reap a rich reward. Respectfully,

RICHARD A. PARKER.

Steel Castings in Locomotives.

In an address delivered Jan. 11, before the New England Railroad Club, on "Steel *vs.* Iron—A Night with a Ghost," Mr. George Richards brought out, in the form of a colloquy with his ghostship, these interesting opinions as to the increasing use of steel casting:

Are there any considerable number of broken cast iron driving wheel centers on American railroads?

Answer—The number is surprisingly large.

What is the remedy?

Answer—Use steel castings.

Can they be made sound?

Answer—As much so as iron, if of good design. All ingots from forged or rolled steel are first cast, and if faulty, the defects exist in the rolled or hammered goods, whether they are plates, bars or rings like tires, yet defects from this are infrequent.

Is the strength of steel castings greater than that of iron?

Answer—Very much so. They are rapidly taking the place of iron casting, and in many cases of iron forgings. The governments of the nations of the world are using them very largely, some of them used weighing several tons. They are required to pass very rigid inspection, and are rejected for very slight defects. Many of the best steamship and railroad companies are already wedded to their use. A representative of a prominent railroad says in a recent letter: "We are using steel castings for driver brake shoes, piston heads, driving boxes and various other parts of locomotives, and intend using steel driving wheels, and are only waiting for some party in America to make perfect castings." Another says: "The wheel centers used by me are steel castings." Another says: "We are using steel castings for centers of driving and other wheels of locomotives and tenders, also use steel castings for other parts such as motion brackets and axle box slides." Another says: "We are using steel castings for driving wheel centers, and to a very large extent for other parts, and the results are satisfactory." Another says: "We are using steel castings for driving wheel centers and parts generally." Another says: "We are using steel castings for driving wheel centers, and on locomotives generally wherever we can; they are very satisfactory." Another says: "We have 1,600 cast steel driving wheel centers in use, and are using steel castings for all parts of engines where cast iron was formerly used, except for cylinders."

PRESIDENT FERDINAND SCHLESINGER, of the Chapin Mining Co., says there is no truth in the report that he has secured a United States lease of the Hamburg patent of stoking coal, and that he intends to construct a blast furnace in Northern Michigan, using that process.

MR. S. P. ELY ON THE REPUBLIC MINE.

Mr. S. P. Ely writes the Marquette, Mich., *Mining Journal* as follows, under a Cleveland date, on some recent comments in that paper upon the future of the Republic mine, and certain misapprehensions indicated by the *Journal's* article:

"I remark in the first place that the board of directors have never contemplated 'the practical abandonment of progressive mining work' upon their mine at Republic; but on the contrary it has been their purpose to persevere in the most thorough exploration and to find all the ore bodies which may exist on their property.

"Secondly, I remark that if any one supposes that this department of work has been in the least degree neglected at the Republic mine during the last three years, that person is mistaken. These are matters of fact, rather than matters of opinion, and their evidence exists in the maps and records which are on file in the company's office, as well as in the mine itself. Since the disappearance of the lenses of ore began to excite alarm three years ago, I undertake to say that in each year all the exploring work has been done which was possible at the levels reached in each year. Diamond drilling, as well as every other practical exploration, was energetically pushed in every reasonable direction to the limit of the ore horizon.

"In the third place, I observe, that the Republic board of directors have always had among themselves and at their command reasonable skill and experience in iron mining. One thing seems to have been strangely overlooked by those whose views are represented by your article: Captain Peter Pascoe has been the mining superintendent of the Republic Iron Co. from the beginning of its operations twenty-one years ago. He is known to be a skillful and intelligent miner. His work speaks for itself and will stand criticism. It may be presumed that after twenty-one years' experience a man of his ability would know something about the mine he worked, and that he would himself have become something of an expert in respect to the condition of its ore bodies.

"A thorough examination of the mine was made, last month, by Mr. Alfred Kidder, for many years the manager of the Champion and Lake Angeline mines, whose scientific and practical qualifications for forming an expert opinion are well known to your readers. His report was read at the annual meeting of the stockholders, which was held last week. It fully corroborates all statements which I have here made as to the thoroughness and extent of exploration for ore which has been carried on during the last three years.

"Mr. Wenstrom recommends deepening No. 8 shaft, and working from it. Doubtless through inadvertence, he omits to mention that he found this very work going on, and that it had been vigorously prosecuted during the whole of the last three years.

"The directors of the Republic Iron Co. have been confronted with a critical position. What remains to be decided is simply a question of policy. No party in the board has ever thought of abandoning the old mine. But our ore bodies are contracting and their horizon is yearly diminishing; year by year a less amount of ore will be won at a greater cost. For three years we have met with no encourngement in our explorations at the old mine, but notwithstanding we expect to proceed with them and find all the ore there is. Meanwhile, is it not best immediately to acquire other good mining property, if it can be done, upon which the company's production can be maintained, and its position reinstated?

"If I have herein spoken positively, it is not without due warrant. I have been a director of the Republic Iron Co. ever since its organization up to the stockholders' meeting last week (when I declined to be a candidate for re-election) and have been entirely familiar with the mine ever since it was opened. More recently, neither advancing years nor a partial residence in a foreign country have prevented the discharge of my official duties. Since this trouble began, I have carefully examined every rod of the Republic mine underground, and I have been at the bottom of every shaft and to the end of every drift, on every level. Very truly yours,

S. P. ELY."

A BOILER exploded at the Waugh Steel Works, Belleville, Ill., Feb. 4, killing three men.

AMONG THE IRON MINES.

Iron Mining Stocks :—

The following quotations of active iron stocks are furnished by H. C. Deming, investment broker, 222 Bank street, Cleveland :

	Par.	Bid.	Asked.
Aurora Iron Co.	$ 25	$ 7.50	$ 8.00
Metropolitan Land & Iron Co., "Norrie"	100	.....	70.00
Lake Superior Iron Co.	25	24.00	26.00
Cleveland-Cliffs Co.	100	48.00	52.00
Minnesota Iron Co.	100	65 00	66.00
Chandler Iron Co.	25	38.00	41.00
Mountain Iron Co., (Mesabi Range)	100	95.00	105.00
Mesabi Mountain Iron Co., "	100	26.00	30.00
Biwabik Mountain Iron Co., "	100	40.00	45.00
New England Iron Co., "	100	8.00	10.00
Cincinnati Iron Co., "	25	2.75	3.00
Great Northern Iron Co.. "	100	9.00	11.00

Menominee Range :—

The Crystal Falls *Diamond Drill* says it is without doubt the purpose of the Schlesinger syndicate to build and operate a road, to handle the ore from their properties on the Menominee and Marquette ranges. A party of surveyors are now at work near Negaunee. The air line distance between Crystal Falls and Negaunee is 48 miles, while the distance to Iron Mountain is somewhat greater. "The building of such a road would carry the significance that all of the Schlesinger mines in this district would be wrought, which includes the Armenia and Claire mines, the latter capable of an annual output of 500,000 tons."

The annual meeting of the Caledonia Mining Co., held at Florence, Feb. 1, the *Mining News* says, resulted in the choice of the following directors: E. E. Keyes, A. E. Guensburg, Emil Guensburg, Florence; John Murphy, Cedar River; D. F. Chandler, Antigo; Geo. A. Fay, Duluth; Silas Bullard, Menasha. The following officers were elected: President, E. E. Keyes; vice-president, John Murphy; secretary and treasurer, A. E. Guensburg. A dividend of 40 cents a share was declared.

The new find near the Appleton mine, that has excited so much comment, is on section 7, town 39, range 28, at the mouth of Pine Creek, four miles from the village of Waucedah, Mich. It is on the lands of the Menominee River Lumber Co., of Marinette, Wis., in which Jesse Spaulding, of Chicago, is the principal stockholder. W. H. O'Brien, of Chicago, secured an option to explore the section. A shaft has been sunk on the vein a distance of 100 feet and a drift has been made 100 feet, all in ore. The shaft is now being cleared of the accumulation of rock and ore resulting from the work of exploration, and a plant of modern mining machinery will be set up as soon as possible.

Marquette Range :—

The report that the C. & N. W. is back of the survey being made between Ishpeming and Marquette, is chronicled by *Iron Ore*, of the former city. Such a line, with the necessary docks at Marquette, would involve a large money outlay and it is questionable whether, with the five cents net advantage in favor of Escanaba that existed through most of last season, Marquette range mines now reached by the C. & N. W. would find it profitable to send all their output to Marquette unless they can be guaranteed equal tonnage through the Soo. The deep water campaign is only begun, and it may be several years before Marquette loads can equal those from Escanaba.

The Hortense mine, as an officer of the company writes us, will be worked the coming season, if prices and freights warrant. The Hortense was formerly known as the North Champion. Its last active year was 1890 and its total shipments are something more than 30,000 tons.

An Ishpeming, Mich., dispatch of Feb. 5 says: "The richest body of iron ore ever found in the Lake Superior district was encountered at No. 7 shaft of the Lake Superior Iron Co.'s hard ore mine a few days ago. Chemical analysis reveals 70 per cent. metallic iron, and the richest ore previously found here was in the Pittsburg & Lake Angeline Co.'s mine, which yielded 67 per cent. As this rich ore was encountered on the eighth level of the mine without the aid of a diamond drill it is impossible to ascertain in what quantities it will be found. Peter White, World's Fair commissioner of mineral statistics of Northern Michigan, was in the city yesterday and selected a quantity of this high grade ore to be sent at once to the Columbian Exhibition."

Another shaft is to be put down in the Lake Angeline basin, somewhere near the eastern end. An extensive system of electrical underground trams are to be put in by both the Cleveland and Lake Angeline companies. It is counted that this will save eight cents a ton over the pushing of ore from stopes to shaft by the trammers.

It is expected that there will be a considerable exodus of miners in the spring from the Marquette range to the Mesabi. Removals from Saginaw, where the mine has closed permanently, are frequent.

Heretofore, explorations at the Winthrop, south side, have been conducted too far south. Lately, core drill borings close to the south foot of the diorite have shown much brighter indications. A workable body of ore is now found, and about 60 tons per day are raised to surface. This promises to be a "big thing," as development goes on.—[Correspondence Engineering and Mining Journal.

Mesabi Range :—

The Duluth Mfg. Co. turned out from their car works, last week, 46 new ore cars for the Duluth, Mesabi & Northern.

The report that royalties at both the Hale and Cincinnati mines had been reduced is denied by Manager Bates, but he admits that both royalties and minimum outputs should be reduced all along the range.

The Mississippi & Northern Railway has decided to extend its line into 58-20. The line is better known as the Wright & Davis road, and was first intended for a logging road, but the plans were afterwards changed to a standard railway. The proposed extension, for which the rails are on the ground, will give railway facilities to the Lake Superior and Washington mining companies. The line, which is 40 miles long, will be operated by the Duluth & Winnipeg.

The *Mesabi Range* tells of preparations for active operations, the coming season, at the Hale mine, the probabilities being that a railroad spur will be built in the spring through Merritt to the mine. Two of the Lidgerwood Mfg. Co.'s overhead conveyors for open pit work have been ordered, and will be in place in about 30 days. The entire plant of machinery will cost in the neighborhood of $10,000. Each conveyor requires 100 men to operate it, and with day and night shifts this means the employment of 400 men.

Geo. A. St. Clair has been successful in securing capital for the development of the Mesabi lands in which he is interested, he raising the $25,000 within the limit provided by the terms of his option. Peter Kimberly was the principal assistant. They think they have one of the best properties upon the range, and will proceed at once to develop it.—[Iron Ore, Ishpeming, Mich.

The hearing on the injunction petition of K. D. Chase, D. W. Grant and Donald Grant against the Merritts and others, to prevent the carrying out of the recent arrangement by which Rockefeller advanced money to complete the Duluth, Mesabi & Northern, will not take place. The difficulty has been bridged by the purchase of the Chase and Grant interests in the road and K. D. Chase will resign as president. Alfred Merritt will succeed him. As a result of the Rockefeller advances of money, and of these recent developments, it is stated that there will be a consolidation of the American Steel Barge Co., and the West Superior Iron & Steel Co., with the D., M. & N. road and the Merritt mining interests on the Mesabi operated in harmony with these corporations—the steel works using Merritt ores to make plates for the Steel Barge Co., the railroad hauling the scores to Duluth, and the Steel Barge Co.'s whalebacks carrying ores from the D., M. & N. docks, at Oneota, to Lake Erie ports. Mr. Lon Merritt says that Rockefeller does not control the D., M. & N., but that the Merritt interest still leads.

Changes in the Ore Business.

W. E. Mack, the well known iron ore commission agent, and N. B. Nye, of the firm of Rattle, Nye & Hollis, analytical chemists and mining engineers, announce that they have formed a partnership under the name of Mack, Nye & Co. for the purpose of dealing in iron ore. Their offices are Nos. 507-9 Western Reserve Building, Cleveland.

Announcement is also made of the dissolution of the firm of Rattle, Nye & Hollis, of Cleveland. Mr. Rattle will continue the business in the offices in the Western Reserve building which the firm now occupy.

WIDELY VARYING BIDS ON CASTINGS.

The twenty-first meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, Wednesday evening, Feb. 1, at 8 o'clock. In the absence of the President, the Vice-President, Mr. Thomas Devlin, was chairman of the meeting. The following persons were present:

P. D. Wanner, Mellert Foundry & Machine Co., Reading, Pa.
Geo. P. Smyser, E. G. Smyser's Sons, York, Pa.
Geo. Rockett, Morris Tasker & Co., Inc., Philadelphia.
Jno. R. Collingworth, Robt. Wetherill & Co., Chester, Pa.
Wm. M. Winks, Davis Coal & Coke Co.
John Brown, Crown Smelting Co., Chester, Pa.
W. H. Fairlamb, Wilmington, Del.
G. R. Rebmann, G. Rebmann & Co., Philadelphia.
Harry Rebmann, G. Rebmann & Co., Philadelphia.
Thomas Glover, Glover Bros., Philadelphia.
Wm. Braun, Jno. Braun & Sons, Philadelphia.
L. B. Whitney, A. Whitney & Sons, Philadelphia.
Chas. Whitney, A. Whitney & Sons, Philadelphia.
Alfred D. Poole, J. Morton Poole Co., Wilmington, Del.
W. R. Brinton, J. Morton Poole Co., Wilmington, Del.
E. E. Brown, E. E. Brown & Co., Philadelphia.
Jas. L. Delaplain, U. S. Foundry Co.
Leslie Griscom, Pennsylvania Diamond Drill & Mfg. Co., Birdsboro, Pa.
T. B. Harkins, T. B. Harkins Foundry Co., Bristol, Pa.
Josiah Thompson, J. Thompson & Co., Philadelphia.
W. H. Hunt, William Adams & Co., Philadelphia.
Thos. F. Maher, Goodell & Waters, Philadelphia.
H. M. Kolb, Lansdale Iron Works, Lansdale, Pa.
Thomas Hobson, *Iron Age*.
Geo. A. Messick, Pusey & Jones Co., Wilmington, Del.
S. G. Flagg, Jr., S. G. Flagg & Co., Philadelphia.
Thomas Devlin, Thomas Devlin & Co., Philadelphia.
Louis Mc. Grath, Thomas Devlin & Co., Philadelphia.
E. B. Marsh, S. Baltimore Foundry, Baltimore, Md.
Andrew McCardell, Pond Machine Tool Co., Plainfield, N. J.
Jas. S. Stirling, Harlan & Hollingsworth Co., Wilmington, Del.
E. E. Durant, G. F. Warner Mfg. Co., New Haven, Conn.
H. C. Vansant, Morris Tasker & Co. Inc., Philadelphia.
A. W. Howe, Philadelphia.
Jones Wister, L. & R. Wister & Co., Philadelphia.
J. N. M. Shimer, L. & R. Wister & Co., Philadelphia.
H. M. Bougher, J. W. Paxson & Co., Philadelphia.
Howard Evans, J. W. Paxson & Co., Philadelphia.

The Executive Committee reported upon the matter of presenting castings and getting prices thereon and decided to ask bids on the same castings which were presented at the December meeting, sending a postal card with a blank place left for the price to be inserted and returned to the secretary so that the average price could be determined. This committee was under the impression that the presentation of castings and the asking of bids for the same was an interesting subject as it is noticed that all persons who attended the meetings examined the castings, which led to a considerable amount of discussion. After the bids have been received, however, the matter will be taken up further and if it found that a few answers have been received it will be well to discontinue.

In regard to the Price Committee, the committee thought best to have it further ventilated at the regular meeting, thinking that it might be objectionable to some foundrymen to have their bids known. The subject of coke will be continued. The Railroad and Freight committee reported progress.

The treasurer reported a balance of $55.80 up to date after all bills are paid.

The following new members were elected: the Chalfant Mfg. Co., hardware and small castings, Lancaster, Pa.; the Frick Coke Co., Pittsburg, Pa., represented by J. Ogden Hoffman, with office at Philadelphia; the Pond Machine Tool Co., Plainfield, N. J., represented by Andrew McCardell, foreman; Novelty Iron Works, Mr. D. R. Kline, General Manager, Allentown, Pa.; Justin J. Pie, general foundry, Osceola Mills, Pa.

Under new business, after a discussion in regard to the committee to ascertain the current prices, or prices at which castings are made in the open market, etc., Mr. P. D. Wanner made a motion that a committee of five representing the different branches of the foundry trade, be appointed, to be known as the price committee, to be appointed by the president and secretary, said committee to meet one-half hour before each regular meeting and report prices at which contracts have been taken for castings, that the foundrymen will know the market prices for castings in general.

Mr. Wanner stated that contracts were given out by the city of Philadelphia, for cast iron pipe at as low as one cent. per pound, which is lower than ever before and in fact it would be impossible to make a living profit at that price. The idea that large concerns could take castings at this price better than small concerns was a mistake. The inquiry is naturally made, where this thing was going to stop? On top of this came the information that a bid was put in for castings for the water department of Philadelphia at $1.44 per 100 pounds and the contract was lost at this figure.

While this Association does not interfere with prices and it is not its intention to make a card price, it is working in the interest of foundrymen, and getting information of value to them to show, if possible, what their castings cost to make, hoping in the end to teach them the folly of selling their product below cost. The impression seems to be that the foundrymen of to-day are too anxious to take work, lacking backbone and allowing the customer to dictate prices.

The following committee were appointed to serve as the price committee named above: P. D. Wanner, chairman, Mellert Foundry & Machine Co., Reading, Pa., representing cast iron pipe; Geo. P. Smyser, R. G. Smyser's Sons, York, Pa., representing architectural work; S. G. Flagg, Jr., of Stanley G. Flagg & Co., representing hardware and malleable castings; L. B. Whitney, of A. Whitney & Sons, representing car wheels; G. R. Rebmann, of G. Rebmann & Co., representing jobbing work.

The bids for 14 pieces of castings on which prices were asked by postal card were then read by Mr. L. E. Whitney. The highest and lowest prices and the average are as follows:

	Weighing Lbs.	Highest. Cents.	Lowest. Cents.	Average. Cents.
No. 1	12	4	1¾	2.43
No. 2	60	3	2	2.50
No. 3	10	3	1¾	2.15
No. 4	16	3	1¾	2.33
No. 5	17½	3	2	2.44
No. 6	8	3	2	2.45
No. 7	27	3	1¾	2.29
No. 8	4	4	2¼	3.00
No. 9	11	4	2½	3.32
No. 10	5	4	1½	2.73
No. 11	1½	5	2.6-10	3.48
No. 12	1¼	7	2¼	3.79
No. 13	⅛	8	2¾	4.57
No. 14	7½	6	2.5-16	4.38

There were only 14 bids received on these castings out of 500 inquiries, which is a much smaller percentage than was expected. It was moved and seconded, therefore, that the association discontinue the presentation of castings and asking for bids.

Mr. Jones Wister entertained the association with a very instructive address on the subject of "Coke, Compared with Anthracite Coal for Foundry Use." He stated that from the fact that one cubic inch of coke contained about 55 per cent. of air cells and coal virtually none, coke was the best fuel, as it allowed the oxygen of the blast to permeate the cells, making quicker combustion, which would run down the iron in about one-half the time that would be required in using coal. They both would contain about the same per cent. of heat units, and the quality of iron would be about the same in either case. He also stated that the cupola tender had much to do with the successful operation of the cupola, as it might be possible to run poor heats with a good quality of coke, and vice versa. He also told how good coke could be determined from bad coke by ordinary inspection, and recommended that purchasers examine their coke before unloading it, and if found not to be up to standard, should notify the seller, and have it corrected before it was unloaded.

Mr. Jones spoke in favor of the Connellsville coke, stating that the seams of coal in the Pittsburg and Connellsville regions were better adapted to making coke than that found in other sections of the country.

Mr. Wm. M. Winks, of the Davis Coal & Coke Co., of Virginia, described the coke made by their company, stating that it contained a less quantity of sulphur than was found in other sections, averaging less than one-fourth of one per cent., and that they were shipping it as far North as Boston, and South to Mexico.

A general discussion then took place regarding fuel and the amount of blast used in cupolas, a number of those present

taking part. The following is about the price at which fuels are selling f. o. b. car, at Philadelphia: Connellsville coke, $4.45 per net ton; good quality anthracite coal, $4.45 per gross ton; gas house carbon, $6.50 per net ton; tar coke, $5.50 per net ton.

A vote of thanks was extended to Mr. Wister for the very able manner in which he handled the subject. His address will be published in the *Iron Age*, the *Foundry*, *The Iron Trade Review* and the *Tradesman*.

This meeting was a very successful one, those present stating they were well pleased with the proceedings. The association may be congratulated at this time, as its members are increasing, and the information which it has procured has been of much value to all foundrymen. HOWARD EVANS, secretary.

Youngstown's New Steel Plant.

Thomas McDonald, formerly of Pittsburg, elected Superintendent of the Ohio Steel Co.'s works, at Youngstown, O., has entered upon the duties of the office. The company has also selected W. C. Lowry, formerly connected with the works of the Carnegie Co., at Homestead, as master mechanic. Henry Wick, a heavy stockholder and official of the company, is thus quoted in reference to its operations: "The capacity of the plant will range from 1,000 to 1,400 tons of finished steel per day, and it will require the product of four large blast furnaces to supply it with metal. The plant embraces a tract of 50 acres and is underlaid with rock, furnishing a solid foundation for the engines and the ponderous machinery. When in operation the plant will furnish employment to from 800 to 1,000 men. Nearly all the contracts have been awarded and the work is being driven as rapidly as possible."

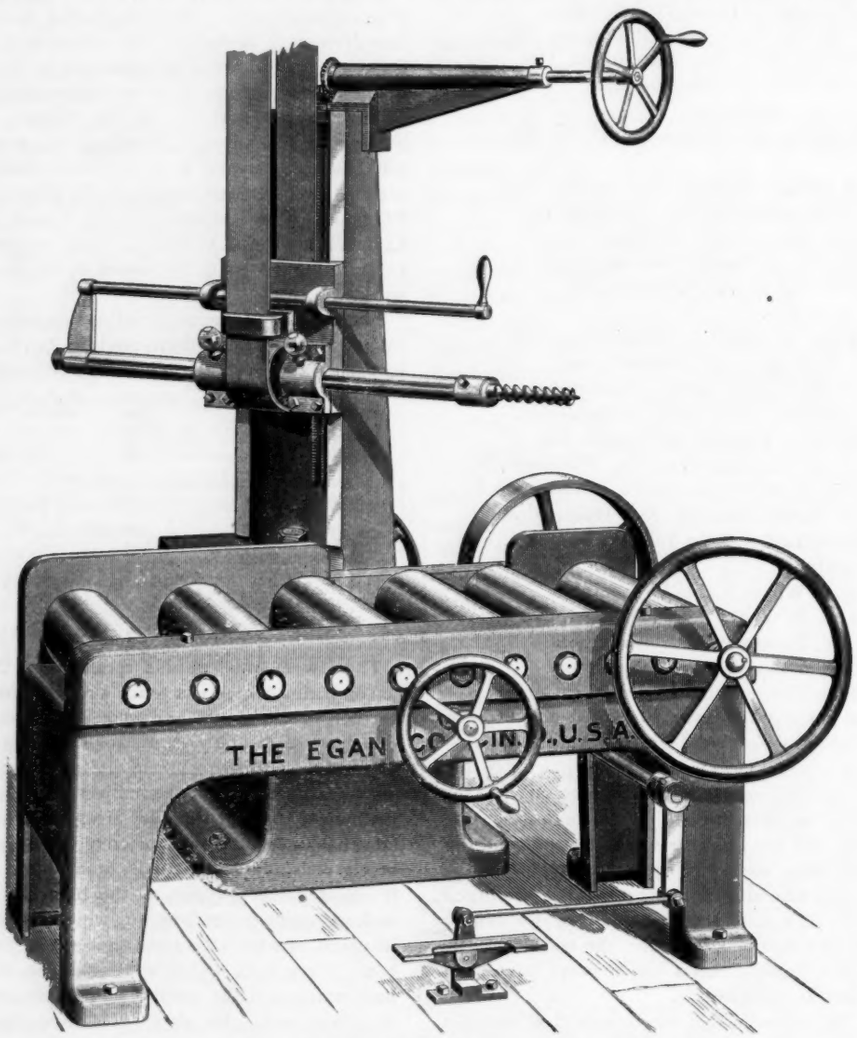
ROBERT J. BEATTY, charged with being an accomplice in the Homestead poisonings, was found guilty, at Pittsburg, last week, the jury being out but a few minutes.

NEW RADIAL CAR BORER.

The machine illustrated herewith is the latest in the line of boring machines. It will bore all kinds of straight or angle holes for car and bridge work, with great rapidity and with ease for the operator. The column is one single column with the main roller frame resting on and bolted to it. The vertical part is made to revolve; its center is the center of the mandrel. It is also made to move in and out on the main column, and also carries the spindle and slide moving up and down on the column, operated by hand wheel and screw.

The rolls, of which there are six, are 6″ in diameter, all driven by gearing and friction operated by foot-power. They can also be driven by hand, if the operator desires.

The mandrel is of best steel, of large diameter. Its vertical stroke is 26″ and its horizontal stroke, 24″. The countershaft is placed above, and provided with a new device, to allow the spindle to be driven at any position without any changes being made. The tight and loose pulleys are 10″x5½″ face,



NEW RADIAL CAR BORER.

and should make 1,000 revolutions per minute. The builders and originators are the Egan Co., 251 to 271 W. Front street, Cincinnati, O.

INDIANA legislators have devised another method of saving natural gas for that State. A bill has been introduced, providing a fine of $500 and imprisonment of from one to five years for the offense of piping gas at a pressure of less than 200 pounds to the square inch. The bill is based on the theory of police regulation, gas being a highly explosive and therefore dangerous commodity.

REDUCTIONS in wages are proposed at the Edgar Thomson Steel Works. It is said that the contemplated basis is a selling price of $25 a ton for steel billets, the reduction applying only to that article. About 400 men will be affected. Announcement is also made of a reduction of 10 per cent. in wages in the drawing department of the Braddock wire mill.

FOUNDRY FLASKS OR BOXES.—I.

BY SIMPSON BOLLAND.

Flasks or moulding-boxes in which the patterns are rammed are made with the view of confining the amount of sand to be used to its smallest limit, consistent with safety, and should be made of such dimensions as will allow of the rammer being used at the distance of from 2 inches to 3 inches from the pattern. If made of wood, there must be a sufficient body of sand between the casting and flask to prevent damage from burning. On this account iron flasks (as a rule) can be made much smaller, thereby saving time and labor in filling in.

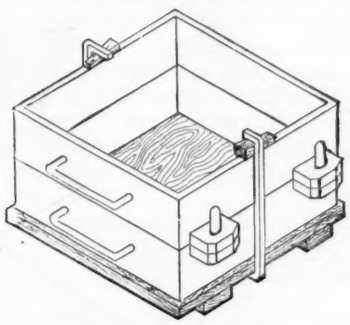


FIG. 1.

Fig. 1 shows a 14-inch iron flask for small work, and where a large quantity of machinery small work is made, such flasks are much superior to wooden ones. Having no bars top or bottom, they are readily rammed and closed, two clamps being sufficient to bind them together for casting.

But when there comes a job requiring large numbers of extra-light castings, the sand can be rammed in a snap flask, in the same manner as in the iron one, and when the mould is closed the flask can be loosened off and the sand cope held down by a flat weight heavy enough to resist the pressure when cast, a hole being cast in the weight to expose the runner or gate. Such a flask is shown in Fig. 2. The hinges and latches are seen at opposite corners, the other corners being bolted or screwed fast. The great advantage in this kind of flask (where it can be used with safety) is the number of iron or wood flasks it saves, as well as the rapidity with which it can be worked.

Fig. 3 is a perspective view of a 24-inch flask. As will be seen, this method does away with the necessity for either clamps, boards, or plates, the bottom or drag part, as seen at Fig. 4, having flat bars cast on. The intermediate parts or cheeks can be made of any depth required. The pin-holes being bored to templet insures a fit, no matter which parts are used. The flask shown has cheek 12 inches deep; others can be made of different depths, enabling the moulder to rig up a part flask to suit his job in very short order, nothing being required but the pins and keys, which must be kept in order by some responsible man, who will see that they are taken out and stored when not in use. Internal flanges may be cast on the bottom edge of the cheeks to suit the kind of work they may be used for. For general jobbing purposes this method of making flasks is good, for, though, a little expensive at first, they pay well in the end.

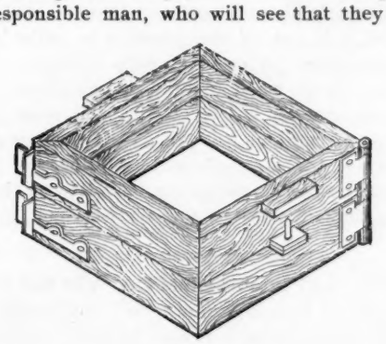


FIG. 2.

LARGER FLASKS, COPES, ETC.

In Fig. 5, a 4-foot cheek part 12 inches deep is shown, with internal flange to carry grates, which may be made to fit any form of pattern, as shown at A and B, the grate in the former fitting a circle, the latter being square, such as would be required for tanks, etc. The lugs are strong and the bolt-holes are cast in; but the holes for pins must be drilled to templet, so that any cheek may be used for cope or drag. The half-inch strips cast on the edges give strength sufficient for this sized flask, and are more easily made than flanges. The lugs must be rammed in a core and bedded against the pattern, and care must be taken to have the holes for bolts made right and left. The internal flange adds strength to the flask, and enables the moulder to rig up for any kind of job at no greater expense than a few grates.

In Fig. 6 I have shown the way to make the cope and drag; the notches in the bars will be appreciated by jobbing moulders particularly. A shows bar for cope, and B for drag. Where it is practicable, wrought-iron swivels can be cast in, as shown at C, Fig. 5; but if swivels must be cast-iron, let them be strong, as shown at C, Fig. 6.

It would be preposterous for me to lay down rules for lifting and handling flasks which would be applicable to all shops; but I show at Fig. 6 two other methods for lifting purposes, besides the swivels. The one at D is a cast handle made in a core, and set against the pattern when the flask is made; of course wrought-iron may be substituted, which is better. At

FIG. 3.

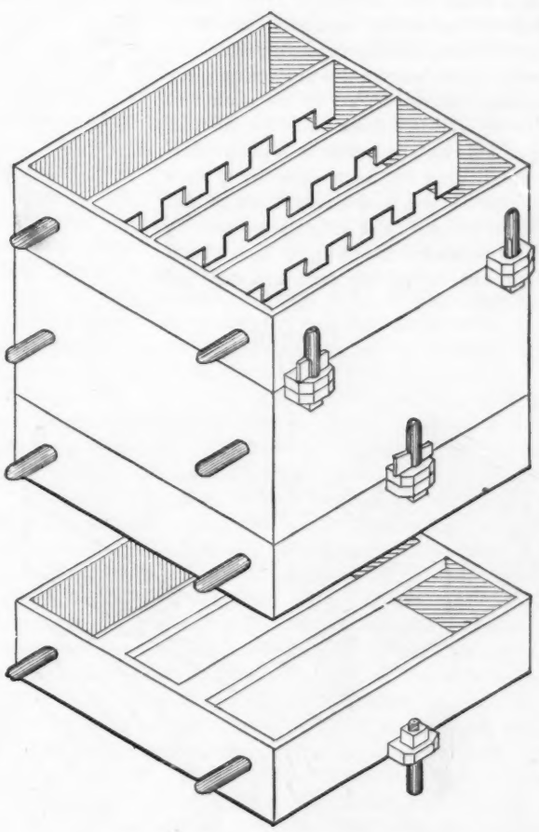


FIG. 4.

E is shown a plain lug, into which, when needed, the ring-bolt F can be made fast. The latter is very simple, and can be made of universal application. Fig. 7 gives plan of a plain cope for floor uses (without flange top or bottom) 8 feet square; it has 15-inch square hole in centre. This flask must be nine inches deep and one inch thick on the outside and ⅞ inch in the bars. Staking pieces can be cast on, as shown at G, Fig. 6. Let the cross on tie bars be placed as seen. The reason for sides and bars being so near alike in thickness is that the expansion and contraction whilst the box is in use may be kept as near alike as possible all over. The arrangement of cross-bars is intended to counteract in some measure the inequalities of the thrust, giving, as they do, elasticity to the structure. A box of this kind, cast with good strong iron, will outlast any other kind that is made for floor purposes. When the sides are made heavy, with flanges, etc., cast to their bars, you may look out for a broken box before it has been in use very long.

FLASKS MADE UP OF LOOSE SIDES, ENDS, AND BARS.

Fig. 8 is a view of sides, ends, and bar for a flask 5 feet wide by 8 feet long and 12 inches deep. As in this case all the parts may be cast in open sand, a very large flask may be strongly

made at a light expense comparatively. It will, of course, be readily seen that (if boxes must be made to fit the job and save labor in moulding) unless some other plan be adopted than to make them all in one piece, the foundry would soon be full of unwieldy flasks, costing considerable time and money to make. It is to overcome this difficulty that the method shown at Fig. 8 is brought into use. It will be seen at A that the bars can be cast to fit any form of pattern; the sides can be made to bolt together as cope and newel, holes for pins being drilled as shown at B and C; the flanges can be bracketed to any required degree of strength. Let the flanges stand in from the edge of side ¼ inch so as to leave a space of ½ inch when they come together, into which mud can be pressed to prevent running out. The end shown is for a wrought swivel D, which is secured by a key as seen at E. Should the box be very wide, and require to be turned over on the swivels, the ends can be still further stiffened, as shown at F. At G I have shown another method, which saves bolting of all the bars; this method necessitates the casting of pockets on the sides to receive the end of a plain bar, as shown at 1. These pockets are made wide enough to admit of the projection 2 sliding in easily; when the bar rests on the bottom this projecting piece is opposite the recess cast in the pocket to receive it, and is driven home by the bent iron 3. This iron or wedge is a plain piece of wrought-iron 1¼ inch wide by ¼ inch thick, bent as seen, and driven down so that the bar is pressed close into the groove; by leaving this wedge standing ¾ inch out at the topit can be quickly knocked out and

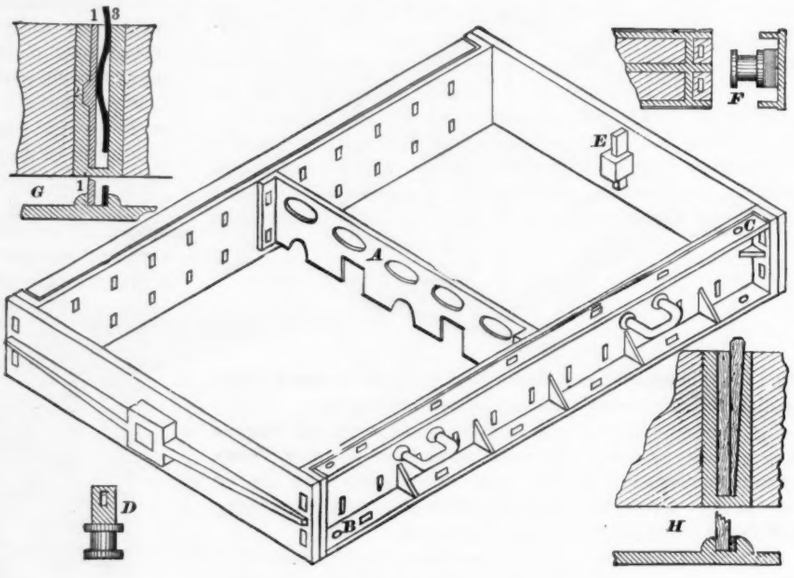


FIG. 8.

FIG. 5.

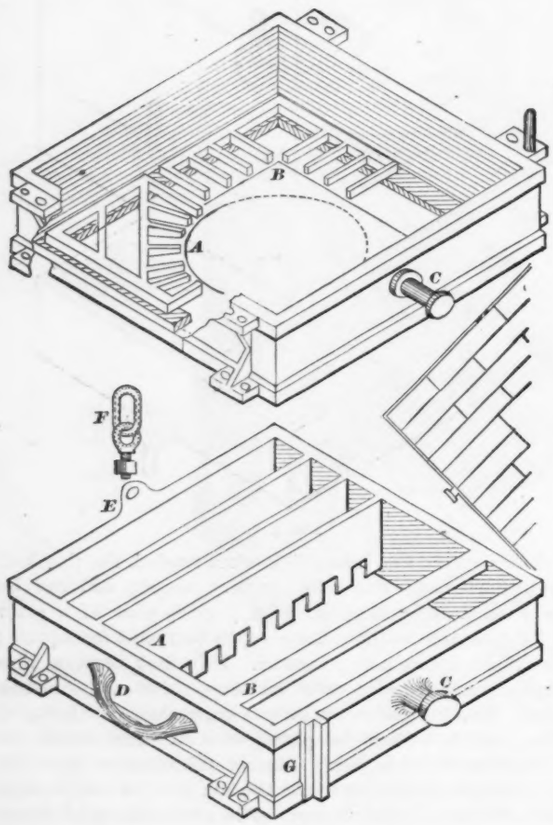


FIG. 6.

FIG. 7.

the bar loosened instantly. This is a very quick method, and only requires a long bolt here and there along the length to make it equal, in strength, to the other. Another advantage where pockets are cast toreceive the bars is shown at H, as on a pinch wooden bars may be substituted for iron ones and made fast with wooden wedges.

FLASKS MADE OF WOOD.

Where wooden flasks can be profitably used, good white pine should be chosen to make them of, as it outlasts any other kind and keeps its shape best. Ordinarily they may be made up to 3 feet square out of 2-inch lumber; beyond that size and up to 6 feet it is best to use 3-inch. Many firms go to great expense in dovetailing the joints—a very bad method, too, as the vent blazes out at the joints of the dovetail, and the flask is rendered useless in a very short time. A much better plan is to let the ends into the sides about ½ inch and nail them firmly together, after which a ½-inch bolt can be passed through each end *in the inside*. If the flasks be long, additional bolts may be passed through in the middle. Greater dependence can be placed on the bolts than on any system of dovetail or spikes.

I have seen many plans for preserving the joints of wooden flasks (which, if unprotected, soon burn away), and in most cases the supposed cure has proved worse than the disease; but should it be considered worth while to protect the edge (and I am satisfied that it is, where the flasks are in constant use), have strips of cast-iron made ¼ inch thick and the width of the lumber, with ins cast on. Have these strips drilled with countersunk holes for screw-heads, and set them hard down on a coat of thick metallic paint. This makes the joint between the iron and wood perfectly air tight, preventing the gas from escaping, and consequently the flask is saved from burning. I have rigged flasks this way which have been in use every day for months without taking any harm from the blaze at the joint.

Another thing I would suggest, where wooden flasks are in constant use: have a boy, or two, if need be, to throw water around the flasks as they are poured; it pays in the end to do this. Sometimes, in shops where help is scarce and the crane untrustworthy, it is out of the question to make large iron flasks. In such cases let cast-iron ends be made with good bolting surface for the wood to bind against; have also here and there a cast iron bar to which the side must be firmly bolted. These precautions add very little to the weight, but serve to increase the strength and usefulness of the flask. Swivels or handles cast on plates can be bolted on the sides or ends, making them in every respect almost equal to the best iron flask.

Carnegie Co. and Illinois Steel Co. Will Not Exhibit.

The Carnegie Co. have withdrawn their application for space at the World's Fair, owing, it is said, to their inability to get the amount of space they desired. It was the company's intention, it is said, to show an ingot of steel weighing 30 tons. The decision is a sudden reversal of the company's plans, as its engineer was at the park a few days before, making arrangements for extra foundations to support the huge mass of steel. Chief Willard Smith, of the transportation exhibits department, says he has a written contract with the company and that all the space was given them that seemed necessary for their exhibit. The Frick Co.'s reported withdrawal is denied. The Illinois Steel Co. have decided, however, not to exhibit, because they could not get the room they wanted.

BESSEMER STEEL INGOTS AND RAILS IN 1892.

Through the courtesy of the Bessemer steel manufacturers, we are able to present complete statistics of the production of Bessemer steel ingots and of Bessemer steel rails of all weights and sections in the United States in 1892, except the comparatively small quantity of rails made by other manufacturers from purchased blooms. In our statistics of ingots we include the production of the few Clapp-Griffiths and Robert-Bessemer plants, and also the production of steel castings. The total production of ingots in 1892 was the largest in our history, exceeding the large production of 1890, and the production of rails was much larger than has generally been supposed.

The following table gives the prodction of Bessemer steel ingots in each half of 1892, and the total production in that year compared with the total production in 1891. We add to the table a statement of the ingots produced by the Clapp-Griffiths works alone:

States—Ingots.	First half 1892. Gross tons.	Second half 1892. Gross tons.	Total 1892. Gross tons.	Total 1891. Gross tons.
Pennsylvania	1,218,504	1,169,508	2,388,012	2,048,330
Illinois	437,067	443,167	880,234	605,921
Ohio	200,946	211,036	411,982	333,666
Other States	202,411	278,333	480,744	259,500
Total	2,058,928	2,102,044	4,160,972	3,247,417
Clapp-Griffiths only	36,974	30,552	67,526	65,389

The total production of Bessemer steel ingots in 1890, the year of largest production prior to 1892, was 3,688,871 gross tons, which was 472,101 tons less than in 1892.

The total production of Bessemer steel rails in 1892, with the exception above noted, was 1,458,743 gross tons, an increase of 219,350 gross tons over the production in 1891. The following table shows the production in each half of 1892 and the total production of the year compared with that of 1891, with the exception above noted for both years:

States—Rails.	First half 1892. Gross tons.	Second half 1892. Gross tons.	Total 1892. Gross tons.	Total 1891. Gross tons.
Pennsylvania	474,018	411,634	885,652	849,556
Illinois	240,925	209,628	450,553	364,725
Other States	57,493	65,045	122,538	25,112
Total	772,436	686,307	1,458,743	1,239,393

The production of Bessemer steel rails by the Bessemer steel manufacturers in 1890 was 1,797,489 gross tons. The production of 1892, while much larger than that of 1891, was 338,746 tons less than that of 1890.—[Bulletin.

Harney Peak Tin Mills Closed.

The Harney Peak Tin Mining, Milling & Mfg. Co.'s mines and mills were closed down on the 2d inst., after a short and unsuccessful run. Superintendent J. S. Childs, who had been in this city in consultation with the American owners of the property, stated, it is said, that this had been done in accordance with a decision arrived at by the owners, and that the suspension will be permanent. This was to be expected by those who followed the reports upon those mines, published from time to time. There will probably be many explanations of the stoppage, but the real cause is the lack of tin in the ore. There is now not a tin mine in operation in the country.—[Engineering and Mining Journal.

The statement is also made that the mill will start up again in the Spring and that any considerable production is delayed until the tariff shall be put in force. There is no likelihood, however, that the provision for a duty on pig tin beginning July 1 will be allowed to go unrepealed. There is a further statement to the effect that Welsh tin plate capitalists have obtained control of the mines.

THE Carbon Steel Co., of Pittsburg, has been awarded the contract for the steel work of the new battleship Iowa and the cruiser Brooklyn. The Cramp Shipbuilding & Engine Co., of Philadelphia, is having their construction in hand. The work to be done by the Carbon Steel Co. includes the nickel protective armored deck. The Carnegie Steel Co. was one of the competitors.

INDUSTRIAL SUMMARY.

New Enterprises:—

The following recent incorporations, specially reported for *The Iron Trade Review*, are of interest to the iron and machinery trade:

Chicago, Ill.—A. Featherstone & Co.; capital, $500,000; to manufacture and deal in vehicles, toys and merchandise; incorporators: Alfred Featherstone, Frederic Ullman, Nicholas W. Hacker.

Battle Creek, Mich.—Central Michigan Carriage Co.; capital, $50,000; for the manufacture and sale of vehicles of all kinds; incorporators: S. S. Hulbert, T. H. Jennings, S. O. Bush, Battle Creek, Mich.

Chicago, Ill.—Finney Motor Co.; capital, $10,000; to manufacture and sell motors and do a general machinery business; incorporators: W. N. Williams, Clifford N. White, Jno. A. Christianson.

New Castle, Pa.—Standard Wire Co.; capital, $20,000; for the manufacture of iron or steel or both, or of any other metal, etc.; incorporators; John J. Van Gorder, Clifford W. Watson, Louis J. Koch.

Chicago, Ill.—The Campbell Automatic Feeder Co.; capital, $25,000; to manufacture and sell the Campbell automatic feeder and other novelties; incorporators: Lawrence Campbell, Mark C. Farr, L. B. Farr.

Chicago, Ill.—American Carbonic Acid Gas Co.; capital, $30,000; to manufacture aud deal in carbonic acid gas, apparatus and merchandise; incorporators: C. W. Gibson, F. A. Schlieper, J. H. Wyman.

Chicago, Ill.—Stokes Manufacturing Co.; capital, $250,000; for general manufacturing, merchandise and transportation business; incorporators: Jno. B. Synnestvedt, Oscar T. Lindrooth, Henry S. Maynard.

Chicago, Ill.—Calumet Electric Mfg. & Engineering Co.; capital, $10,000; to manufacture and deal in general electric machinery and work; incorporators: Lucius Alvin Hine, Geo. Edensor Dorman, E. M. Ashcraft.

Chicago, Ill.—Chicago Smokeless Furnace Co.; capital $100,000; to manufacture and deal in smoke preventing and fuel saving attachments to furnaces; incorporators: Chas. E. Walker, Delos Car Skaden, Jno. D. Bancroft.

Monticello, Ind.—The Monticello Mfg. Co.; capital, $10,000; for manufacturing spokes and wagon and carriage woodstock, lumber and timber generally; incorporators: Andrew J. Robinson, J. E. Redmond, W. H. Bringhurst, J. H. Kinsey.

Fremont, O.—The Unsinger Mfg. Co.; capital, $2,000; for manufacturing and selling flexible pot and kettle cleaners and other tools, utensils, etc.; incorporators: Peter Unsinger, Chas. Hagemann, Herman A. Epps, Wm. A. Cox, Lester Wilson.

Milton, Pa.—The Milton Mfg. Co.; capital, $8,000; for the manufacture of iron or steel or both, or of any other metal or any article of commerce from metal or wood or both; incorporators: Samuel J. Shimer, Elmer S. Shimer, Geo. S. Shimer.

Muskegon, Mich.—Weighing Truck Co.; capital, $20,000; for the manufacture and sale of trucks of all kinds, and other articles connected therewith; incorporators: Frank E. Presley, Farwell Mich.; Jos. M. Brown, Robert E. Bunker, Muskegon, Mich.

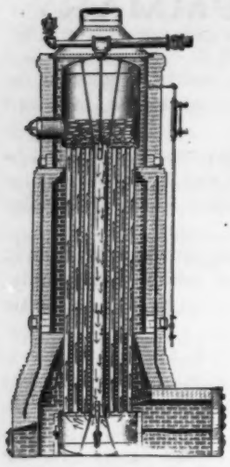
Dixon, Ill.—The Miller Steam Pump Co.; capital, $100,000; to manufacture and sell steam and other pumps and do general manufacturing and foundry and machine work business; incorporators: Cassius M. Miller, Wm. Barnett, Edgar E. Miller.

Chicago, Ill.—The James Steam Cook Stove Co.; capital, $150,000; to manufacture steam, oil, vapor and gas cook stoves, burners, frames, washers, and all necessary articles incident thereto; incorporators: Will S. James, W. W. Watson, C. S. Neeros.

Aurora, Ind.—Stedman's Foundry & Machine Works; capital, $50,000; for the manufacturing of machinery, the making of castings and the carrying on of a general foundry business; incorporators: Nathan Stedman, Wm. R. Stedman, Geo. M. Stedman.

Cleveland, O.—The Superior Machine Co.; capital, $25,000; for manufacturing and selling gear cutting machinery, dies, stamps, tools, electrical appliances, etc.; incorporators: F. H. Bultman, Louis Smith, A. G. Carpenter, H. R. Sanhorn, Wm. H. K. Ross.

Philadelphia, Pa.—Lawrence Gas Fixture Mfg. Co.; capital, $10,000; for the manufacture and sale of gas pipe, gas, electric



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ALL KINDS OF

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Of All Kinds.

or combination fixtures, machinery and articles of commerce, etc.; incorporators: Jno. D. Harris, Franklin C. Paxon, J. Grier, R. Dickley.

Cadillac, Mich.—The Newark & Drury Co.; capital, $30,000; to manufacture, buy and sell hardware, mill and lumbering supplies, shingles and other forest products; incorporators: Alfred W. Newark, Chas. H. Drury, Wellington W. Cummer, all of Cadillac, Mich.

Hamilton, O.—The Miami Mill Works Co.; capital, $15,000; for manufacturing flour mill and spice mill machinery separators, scourers, rolling screens, magnetic machines for separating metals from grain and coffee, etc.; incorporators: P. B. Holly, C. A. Salzman, T. A. Seip, C. M. Semler, S. E. Fye.

Goshen, Ind.—The Goshen & Elkhart Implement Co.; capital, $25,000; for the manufacture and sale of agricultural implements, tools and buggies and for the purchase and sale of threshing machines and all kinds and classes of heavy machines; incorporators: Daniel T. Kauffmann, Jos. J. Throyer, Christopher C. Yoder, Jacob C. Kulp, Enos B. Kulp.

Marion, Ind.—Klein Furnace Range Co.; capital, $25,000; to buy, sell and manufacture furnaces and ranges either from raw material or from materials in any state of development, to transact any and all business at any place necessary to such purchase or manufacture, and to market and sell the product of such manufacture; incorporators: Thad. Butler, Hugh T. Hamilton, Jno. M. Gabel.

New Buyers in the Market, and Some of Their Wants:—

A company has been organized at Barnesville, O., with $50,000 capital, to erect and operate an extensive canning factory.

The Co-operative Foundry Co., of Chattanooga, have secured subscriptions to their stock sufficient to start their works and will begin operations in a short time.

The Minneapolis Bridge & Iron Co. has filed articles of incorporation; capital $150,000. They will begin business March 1. Incorporators are Jones A. J. Rinker, O. Hoff, L. H. Johnson and C. F. Haglin.

White-Kingsal Mfg. Co., Chicago, capital $200,000, has asked for a charter. Will manufacture steel implements and tools. Incorporators, Abraham W. Kingsal, and Orvande D. White, and Marcus M. Towle.

Sealed proposals will be received at the office of the Supervising Architect, at Washington, until 2 P. M., Feb. 17, for all the labor and materials required for the cut stone and brick work, iron and wood floor, ceiling and roof construction and roof covering for the superstructure of the United States post-office building, at Cedar Rapids, Ia.

Col. A. L. Conger, I. C. Alden and C. E. Sheldon, leading officers of the Whitman & Barnes Mfg. Co., which has factories at Akron and Canton, O., Syracuse, N. Y., and St. Catherines, Ont., for the manufacture of mower and reaper knives, and at Akron, of Diamond twist drills, in addition, have been in Chicago, the past week looking for a site for a new factory. It will manufacture the same products that are turned out at the other establishments of the company. The move is for the better accommodation of a growing Western trade.

Additions, Enlargements, Removals, Etc.:—

The Brackett Bridge Co., which has a large plant near Glendale, Cincinnati, will make additions to its plant.

The Union Iron & Steel Co., of Youngstown, O, are negotiating with Ashland, Ky., parties for the removal of their rolling mill at Pomeroy, O., to Ashland. The company are offered a free site on the river bank on the line of the C. & O., and if they accept it, as seems likely, will put up a mill employing 350 men.

The American Fire Arms Co., of East Boston, Mass., have closed a contract to remove their works to Milwaukee. The buildings are to cover a ground space of 70x300 feet and be of brick, two stories high. The works will give employment to 150 to 200 men. The product consists largely of harmless fire arms or toy guns. The company has a capital stock of $300,000.

Fires and Accidents:—

The National Wringer Works, at Canton, O., burned Feb. 1. Loss $10,000.

The engine room of the insane asylum, at Dunning, Ill., was wrecked by fire; loss, $20,000.

At Pontiac, Mich., the boiler of Stewart's factory exploded Jan. 30, and destroyed the entire works.

The Xenia Paper Mill Co.'s works, at Xenia, O., burned down Feb. 2; loss $75,000. New power outfit will be needed.

Warner's Portland Cement Works, at Syracuse, N. Y., burned

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STORES AND WAREHOUSES AT
Boston, Mass.; New York, N. Y.; Philadelphia, Pa., Cincinnati, O.; Chicago, Ill.; Kansas City, Mo.; San Francisco, Cal.; London, Eng.; Paris, France.

Feb. 1, and will be rebuilt at once. Loss, $175,000; insurance, $106,000.

At the Star foundry in Worchester, Mass., 14 men were injured by hot slag which exploded on striking wet ground, wrecking the building.

The extensive plant of the Portsmouth (O.) Wheel Works burned Jan. 29. The loss is close to $100,000. Cincinnati capitalists compose the company.

The Pittsburg & Western round house, at Allegheny, Pa., burned Feb. 1, causing $35,000 loss. Loss on engines damaged, $4,000; on machinery, $22,000.

The Crawford Steam Engine Works, at Duluth, sustained $22,000 damage by fire last week. Insurance, $15,000. Lathes, shafting, belting, etc., were entirely ruined.

At Tyrone, Pa., a fire supposed to be incendiary, as a strike was in progress, destroyed the foundry and machine shops of Austin Bros. & Porter. The loss is $25,000 and the insurance, $15,000.

The Port Royal Coal & Coke Co.'s mines, at Port Royal, Pa., have been on fire for the past week, and it has been determined to flood them. This will require about 20 days, and it will be two months before the mines can be operated again. The loss will be from $70,000 to $80,000. The Port Royal mines are of great extent and are full of valuable machinery. A number of Youngstown capitalists are interested in them.

General Industrial Notes:—

The Grinnell iron foundry, at New Bedford, Mass., has been sold to the Smith-Castleton Co., for $43,000.

The repairs on the Douglas furnace, at Sharpsville, Pa., have been completed, and the furnace blown in.

The plant of the Bellefonte (Pa.) Furnace Co., which has been idle for over two years, will be blown in about the 1st of March.

The Bessemer steel works of Pueblo, Col., have started in on their big order from the Union Pacific for 15,000 tons of 70-pound steel rails.

James E. York has been in Pittsburg recently buying machinery for the new steel plant at Duluth, the erection of which he is superintending.

The finishing department of Oliver Bros.' South 10th street mill, Pittsburg, has been shut down to allow the furnaces to be arranged for using coal instead of gas as fuel.

The nut and bolt men of the country met at Pittsburg last week. C. W. Scofield, of Cleveland, was among the few attendants at the meeting. Nothing was done with prices.

A Greensburg, Pa., special tells of the sale of the Ridgeview Coal & Coke Works for $28,000 to a company, including Leonard Keck, of Latrobe. Work will soon be resumed.

The colored mill men taken in a special car to Zanesville from Pittsburg were met by Amalgamated men and persuaded not to go to work for the Ohio Iron Co. They were sent back to Pittsburg.

The Priestman Co. have lately shipped a 10-horse indicated engine to Hendersonville, N. C., to replace a water wheel for wood yard and grist mill work; and one for electric lighting to Brownsmill, Tex.

The Pittsburg Steel Casting Co. reports many inquiries for the forged steel balls it recently began to make, as noted in the columns of *The Iron Trade Review*. They are now made up to 12 inches in diameter, instead of nine inches as formerly.

Supt. Campbell, of Pomeroy, O., and John H. Russell, B. W. Foster, E. English and J. S. Caldwell, of Huntington, W. Va., have been in Youngstown negotiating with the Union Iron & Steel Co., it is said, for the purchase of their rolling mill at Pomeroy, O.

The Madison Car Co., of Madison, Ill., have recently added eight overhead cranes to their wheel foundry. They have adopted the Whiting patent system, manufactured by the Detroit Foundry Equipment Co.—a total of 20 cranes of this make in use in this foundry.

A large force of men has been put at work making repairs preliminary to the resumption of operations at the J. P. Witherow works, New Castle, Pa. A small force will be employed, but it is expected that within 60 days the original force of 300 men will be taken on.

Amos Whiteley & Co.'s mower and reaper works, at Springfield, O., have been transferred to a new company, known as the Whiteley Machine Co., incorporated under the laws of New Jersey, capital $100,000. The head of the new company is Oliver S. Kelley, formerly a partner of Wm. N. Whiteley.

William Tod & Co. have this week an order from the Cleveland Rolling Mill Co. for a pair of 10-ton converters with supporting frames and operating machinery for their new Bessemer department. W. B. Pollock & Co. will do the plate iron work included in this contract.—[Youngstown (O.) Telegram.

The Carnegie Steel Co. has secured the contract from the Metropolitan West Side Elevated Railroad Co., of Chicago, for the construction of 14 miles of elevated road. The stipulation is a certain price per pound for the iron in the form of a complete roadway. The work is to be completed Feb. 1, 1894. The contract aggregates about $3,000,000.

It is understood that only $120,000 Ft. Payne (Ala.) Coal & Iron Co. bonds were deposited under the reorganization plan,

and only $8,000 was subscribed for new stock, against $100,000 desired. The plan, as before remarked, was a failure, and there remains, apparently, only the alternative of a foreclosure of the mortgage and reorganization upon a bedrock basis.

The Berlin Iron Bridge Co., of East Berlin, Conn., will build the new machine shop for S. F. Hodge & Co., Detroit, Mich. The building will be 150 feet long and of the modern type, the central portion being 40 feet in width controlled by a traveling crane of 20 tons capacity, with a wing on each side 22 feet in width, the wings being two stories high. When completed it will be one of the best machine shops in the Northwest.

The Bellaire Nail Works will enlarge their plants by building a new blast furnace, the Wheeling *Intelligencer* says, and an additional mill will probably be put up next Summer. The capital stock of the company is $750,000 and surplus $400,000. Earl W. Oglebay, of Cleveland, J. R. McCourtney, Charles W. Brockunier, James Wilson, Fred Seabright, John A. Gallaher and A. B. Carter were elected directors.

The blast furnace is now running smoothly and turning out a heat at regular intervals of four hours each. There is no trouble from "frozen" iron at the bottom of the furnace which caused so much difficulty before and was the principal cause of the failure to make the plant a success. It is evident that the present management is a success at starting up a furnace.—[West Duluth letter in Superior, Wis., Telegram.

At Pittsburg, the Anchor Foundry & Machine Co., owned by Wharton McKnight, failed for $124,000; assets about $100,000. There are two large iron and steel foundry plants, one on Duquesne way and one at Penn and First avenues. The construction of steam engines, castings and general mill supplies is the firm's line of business, and nearly 500 men were employed. It is believed that operations will soon be resumed.

A Mahoning valley mill owner is thus quoted on the recently proposed purchase of Valley mills in a lump: "No one has any options on the rolling mills and furnaces. The facts are that a syndicate offered to pay $7,000,000 for our properties and the answer was that when they came with the hard cash the sale would be made. There is no option about it. Some of the mill owners wouldn't sell out now anyway; at least they so express themselves."

The contract was let at St. Louis, Jan. 31, for the construction of the St. Louis & Chicago Electric Railway to Bagnell Brothers, of St. Louis, and Givens Brothers, of Memphis, and work will be pushed forward, rapidly, with a view to having the road completed in time to handle World's Fair traffic. The contractors have taken $2,000,000 in bonds of the company, and have deposited a forfeit with the St. Louis Trust Co. for the performance of the work.

The Cincinnati *Commercial Gazette*, in the third of its industrial issues, gives large space in reading matter and in illustration, to the wood-working machinery interests of the Queen City. It estimates that if saw mill enginery be included in the wood-working machinery, the total output for a year of this industry in Cincinnati is $3,000,000 worth. There is an interesting interview with Thos. P. Egan, president of the Egan Co., tracing the expansions of that great establishment from its beginings in 1870.

An officer of the Tennessee Coal & Iron Co., writing to a Chattanooga paper about the report that the company is not making any repairs to the furnaces out of blast, says: "We have seven of our 17 furnaces out of blast at this moment, and are spending more money on repairs and in making improvements to them, than we have ever spent before at any one time. There never was a time when we could make improvements so cheaply as now, owing to the low price of machinery, and we are largely increasing the capacity of the plant, which in its turn decreases the cost of production. Of the seven furnaces out of blast, one is finished and drying out, ready to go

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into blast again next week; other two or three will be finished in about four weeks, but we cannot hasten work in frosty weather. You may take my assurance for it, all stories to the contrary notwithstanding, that the company's plant has never at any time been in as superb a condition of efficiency as it is to-day."

The Totten & Hogg Iron & Steel Foundry Co., 24th and R. R. streets, Pittsburg, are remodeling their entire plant. They have just placed a new engine and boiler in their foundry department, a new engine in their machine shop, new engines on all their cranes, new roll lathes in roll department, and are replacing the machinery in the machine shop with new tools of the latest design. Some of these new tools have already arrived and are in position and contracts have been let to Eastern parties for other machines. The company are fitting their plant to manufacture rolling mill engines in addition to their rolling mill machinery. They have plenty of orders on their books, and are now running night and day.

Saniter's Process for Desulphurizing Iron and Steel.

In our issue of Dec. 10th we gave a full account of the new process discovered by Mr. E. H. Saniter, of Wigan, England, for desulphurizing iron and steel by mixing a certain proportion of lime and calcium chloride to the molten pig. Further information has been given by Mr. Saniter in a paper read toward the end of December before the Cleveland Institute of Engineers, England. From this paper we gather that the new process has been tried by leading metallurgists in England since its first announcement, and that the claims put forward by its inventor have in all cases been substantiated. Also, additional details of the process are given. If it is desired to remove the sulphur alone without touching the silicon, the calcium chloride must be dried before being mixed with the lime, whereas, if it is desired to remove the silicon as well as the sulphur, the calcium choride must be used wet. About 25 lbs. of calcium chloride and 25 lbs. of lime are required to treat a ton of iron, and the cost of these materials is 12 cents per ton of iron. Mr. Saniter gives examples of working where the poorest qualities of pig have been used in producing steel of excellent quality, and he states that he has produced wrought iron equal in quality to Swedish iron at much less cost.—[Engineering and Mining Journal.

THE rolling mills of the Harris Forge & Rolling Mill Co., at Irondale, Minn., partly burned down Feb. 5, with $25,000 loss. They were built in 1890 and put in operation in March, 1891. There were one single and four double puddling furnaces, two heating furnaces, two trains of rolls, 18-inch and 10-inch, and two hammers. The annual capacity was 18,000 tons of finished iron.

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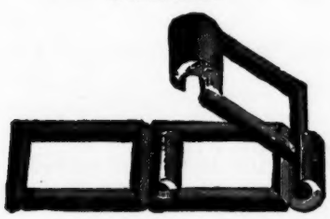

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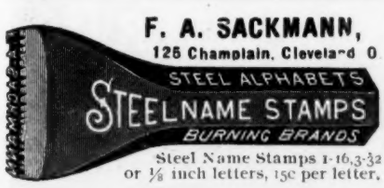

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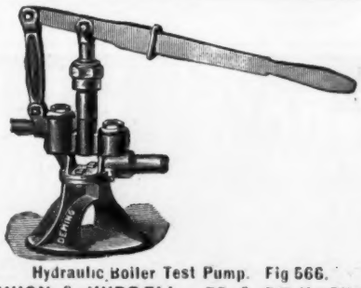

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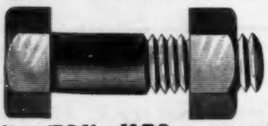

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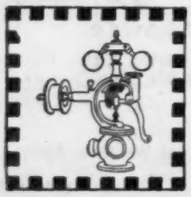

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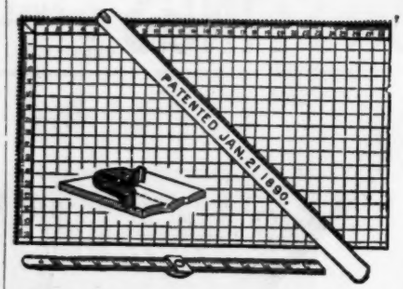

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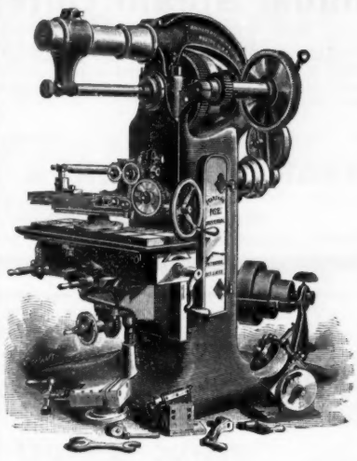

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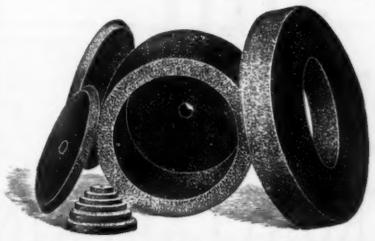

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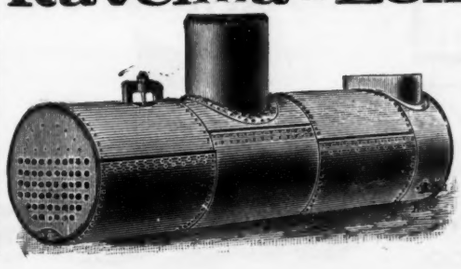

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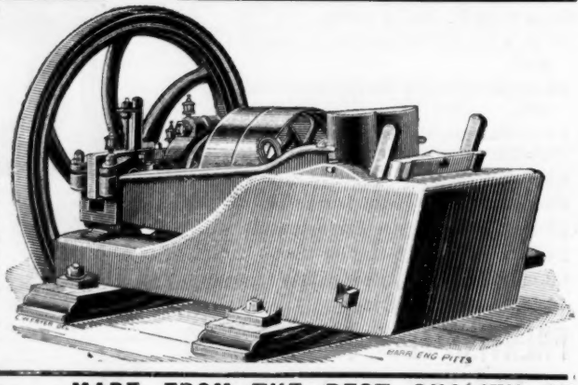

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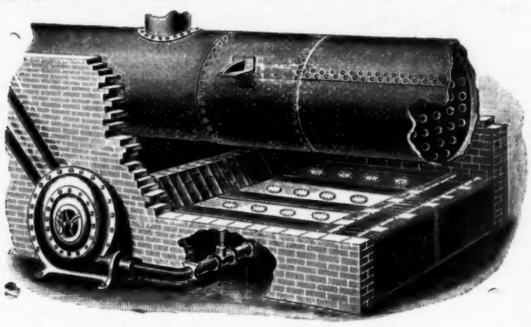

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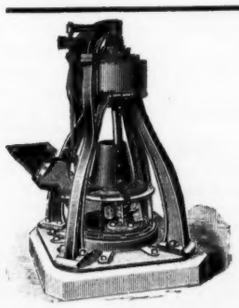

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The Bradford Mill Co., Cincinnati, O.

Furnace Linings—
Union Mining Co., Mt. Savage, Md.

Foot and Power Lathes—
H. L. Shepard, Cincinnati, O.
Sidney Machine Co., Sidney, O.

For Sale—
E. A. Wheeler, Sharon, Pa.

Fans—
B. F. Sturtevant Co., Boston, Mass.

Friction Clutch Pulleys—
J. H. & D. Lake Co., Hornellsville, N. Y.

Flue Cleaners—
E. Rayfield, Chicago, Ill.

Furnace Grates—
Gordon Hollow Blast Grate Co., Greenville, Mich.

Fuel Oil Burners—
Gilbert & Barker Mfg. Co. Springfield, Mass.
Kenderdine Hydro Carbon Fuel Co., Frankford, Philadelphia, Pa.
C. D. Juvinall & Co., Upper Sandusky, O.

Galvanizers—
H. H. Hodell, Cleveland.

Grindstones—
E. K. Morris & Co., Cincinnati, O.

Glass Boards—
Canton Saw Co., Canton, O.

Gearing
Straub Machinery Co., Cincinnati, O.

Graphite Paint—
Jos. Dixon Crucible Co., Jersey City, N. J.
W. W. Lawrence & Co., Pittsburgh, Pa.

Grate Bars—
Gordon Hollow Blast Grate Co., Greenville, Mich.

Higgs & Seaman's Gas Valves—
Totten & Hogg Iron and Steel Foundry Co., Pittsburgh, Pa.

Heaters and Purifiers—
Stilwell & Bierce Manufacturing Co., Dayton, O
E. H. Jones & Co., Cleveland.
Warren Webster & Co., Philadelphia, Pa
Brightman Stoker Co., Cleveland, O.

Hack Saws—
Millers Falls Co., New York City.

Hardware Specialties—
The Sam'l C. Tatum Co., Cincinnati, O.

Heavy Hardware—
E. K. Morris & Co., Cincinnati, O.

Hangers, Pulleys and Shafting—
Lane & Bodley Co., Cincinnati, O.
The Sam'l C. Tatum Co., Cincinnati, O.
J. W. Foley & Co., Cincinnati, O.

Heating and Ventilating Fans—
B. F. Sturtevant Co., Boston, Mass.

Hydro-Carbon Burners—
Kenderdine Hydro-Carbon Fuel Co., Philadelphia, Pa.
C. D. Juvinall & Co., Upper Sandusky, O.

Iron Filler—
W. W. Lawrence & Co., Pittsburgh, Pa.

Iron Nails and Steel—
Weber & Co., Cincinnati, O.

Iron Ore, Bar and Pig Iron—
Oglebay, Norton & Co., Cleveland.
J. H. Outhwaite & Co., Cleveland.
Condit-Fuller Co., Cleveland.
E. C. Pope, Cleveland.
Cleveland Iron Mining Co., Cleveland.
Corrigan, Ives & Co., Cleveland.
Aetna Iron & Steel Co., Bridgeport, O.
B. M. Jones & Co., Boston and New York.
Wilhelm & Co., Harrisburg, Pa.

Iron Rolls and Pinions.
Totten & Hogg Iron and Steel Foundry Co., Pittsburg, Pa.

Injectors—
Penberthy Injector Co. Detroit Mich.
Eagle Lubricator Co., Cleveland, O.
American Injector Co.

Iron and Steel Roofing—
Sykes Iron & Steel Roofing Co., Niles, O.
Berger Mfg. Co., Canton, O.
Porter Iron Roofing & Corrugating Co., Cincinnati, O.

Iron and Steel Wire—
Trenton Iron Co., Trenton, N. J.
Curtis Steel Roofing Co., Niles, O.

Investments—
Frank R. Biedler, Baltimore, Md.
Fidelity & Deposit Co., Baltimore, Md.
Duluth Mining Investment Co., Duluth, Minn.
Geo. Pemberton, New York.

Insurance Companies—
Hartford Steam Boiler I. & I. Co., Hartford, Ct.

Improvement Companies—
Muncie Land Co , Muncie, Ind.

Lathes—
Sidney Machine Co., Sidney, O.
H. L. Shepard, Cincinnati, O.
Aurora Tool Works, Aurora, Ind.
The Bradford Mill Co., Cincinnati, O.
Hill, Clarke & Co., Chicago, Ill.
Prentiss Tool & Supply Co., Chicago, Ill.

Lathe Tools—
Armstrong Bros. Tool Co., Chicago, Ill.

Link Belting—
The Jeffrey Mfg. Co., Columbus, O.

Lifting & Mixing Machinery—
J. H. Day & Co., Cincinnati, O.

Land Companies—
Muncie Land Co., Muncie, Ind.

Lanterns—
Rau Manufacturing Co., Chicago, Ill.

Lubricators—
Eagle Lubricator Co., Cleveland, O.
Lunkenheimer Brass Mfg. Co., Cincinnati, O.

Machinists' Tools and Supplies—
Aurora Tool Works, Aurora, Ind.
Cincinnati Milling Machine Co., Cincinnati, O.
Godfrey J. Bremer, Kalamazoo, Mich.
Hill, Clarke & Co., Chicago, Ill.
Callender & Patterson, Dayton, O.
Prentiss Tool & Supply Co., Chicago, Ill.

Machine Shops—
Toledo Machine & Tool Co., Toledo, O.
Spicer Mfg. Co., New Philadelphia, O.
Harn, Ow & Co., Beaver Falls, Pa.
Godfrey J. Bremer, Kalamazoo, Mich.

Moulding Sand—
Garden City Sand Co., Chicago, Ill.
J. Downerd & Son Co., Zanesville, O.
The S. Obermayer Co., Cincinnati, O.

Mining Machinery—
Copeland & Bacon, New York.

Metal Ceilings—
Fred F. Bischoff, Chicago, Ill.

Metal Sawing Machines—
Higley Sawing and Drilling Machine Co., New York City.

Municipal Bonds—
Frank R. Biedler, Baltimore, Md.

Milling Machines—
Cincinnati Milling Machine Co., Cincinnati.
Godfrey J. Bremer, Kalamazoo, Mich.
Brainard Milling Machine Co., Hyde Park, Mass.
Hill, Clarke & Co., Chicago, Ill.
Prentiss Tool & Supply Co., Chicago, Ill.

Mill Machinery—
Straub Machinery Co., Cincinnati, O.

Mines and Mining Stock—
Frank R. Biedler, Baltimore, Md.

Mining Engineers—
A. Leofred, Quebec, Can.

Mechanical Engineers—
J. C. Slocum, Chicago, Ill.

Office Furniture—
Cleveland Desk Co., Cleveland, O.

Oilers—
Rau Manufacturing Co., Chicago, Ill.

Oil Burners—
Kenderdine Hydro-Carbon Fuel Co., Philadelphia, Pa.
C. D. Juvinall & Co., Upper Sandusky, O.

Oil Grease Cups—
Lunkenheimer Brass Mfg. Co., Cincinnati, O.

Oil Well Machinery—
The Golley & Finley Iron Works, Lima, O.

Oil Tanks—
Aultman, Taylor Mfg. Co., Mansfield, O.

Ore Crushers—
Bradley Fertilizer Co., Boston, Mass.
Totten & Hogg Iron and Steel Foundry Co., Pittsburgh, Pa.

Pumps (Steam)—
E. H. Jones & Co., Cleveland.
Deming Co., Salem, O.
Brightman Stoker Co., Cleveland, O.
Henry R. Worthington, New York City.

Paint—
Iron Clad Paint Co., Cleveland.
W. W. Lawrence & Co., Pittsburg, Pa.
Jos. Dixon Crucible Co., Jersey City, N. J.

Perforated Sheet Metal—
Harrington & King Perforating Co., Chicago, Ill.
Aitchison Perforated Metal Co., Chicago.

Photo-Engravers—
National Photo-Engraving Co., Cleveland.

Powder—
Hercules Powder Co., Cleveland.

Presses—
Toledo Machine and Tool Co., Toledo, O.
Godfrey J. Bremer, Kalamazoo, Mich.
Cleveland Stamping & Tool Co., Cleveland, O.

Planers—
Prentiss Tool & Supply Co., Chicago, Ill.

Plumbago—
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The S. Obermayer Co., Cincinnoti, O.

Pulleys—
Straub Machinery Co., Cincinnati, O.
Lane & Bodley Co., Cincinnati, O.
J. W. Foley & Co., Cincinnati, O.

Power Plants—
Weston Engine Co., Painted Post, N. Y.

Portable Forges—
B. F. Sturtevant Co., Boston, Mass.

Plates—
Aetna Iron & Steel Co., Bridgeport, O.

Pulverizing Machinery—
Bradley Fertilizer Co., Boston, Mass.

Railway Supplies—
Cleveland City Forge & Iron Co., Cleveland.

Radial Drills—
Universal Radial Drill Co., Cincinnati, O.

Rock Breakers—
Totten & Hogg Iron and Steel Foundry Co., Pittsburgh, Pa.
Bradley Fertilizer Co., Boston, Mass.

Rolling Mill Machinery—
The Lloyd-Booth Co., Youngstown, O.
Totten & Hogg Iron and Steel Foundry Co., Pittsburg, Pa.
General Engineering Co., Harvey, Ill.

Roll Lathes—
Totten & Hogg Iron and Steel Foundry Co., Pittsburg, Pa.

Steam Boiler Inspectors—
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

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Canton Saw Co., Canton, O.

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Brightman Stoker Co., Cleveland, O.

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Cleveland Rolling Mill Co., Cleveland.

Sheet Iron—
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The Golley & Finley Iron Works, Lima, O.
Aetna Iron & Steel Co., Bridgeport, O.
Ravenna Boiler Works, Ravenna, O.

Semi-Steel—
South Chicago Foundry Co., Chicago, Ill.
Totten & Hogg Iron and Steel Foundry Co., Pittsburg, Pa.

Sheet Steel—
Aetna Iron & Steel Co., Bridgeport, O.

Steel Stamps and Stencils—
J. H. Fleharty & Co., Cleveland.
F. A. Sackman, Cleveland, O.

Steel Color Paint—
W. W. Lawrence & Co., Pittsburgh, Pa.

Steel Castings—
Chester Steel Casting Co., Philadelphia, Pa.
New Castle Steel Casting Co., New Castle, Pa.
Congdon Brake Shoe Co., Chicago, Ill.
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Totten & Hogg Iron and Steel Foundry Co., Pittsburgh, Pa.
F. E. Roberts Foundry Co., Chicago, Ill.

Scrap Iron & Steel—
Klein & Cohn, Cincinnati, O.

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J. H. Day & Co., Cincinnati, O.
Godfrey J. Bremer, Kalamazoo, Mich.
General Engineering Co., Harvey, Ill.
Cleveland Stamping & Tool Co., Cleveland, O.

Shafting—
Straub Machinery Co., Cincinnati, O.

Stokers—
Brightman Stoker Co., Cleveland, O.

Steel Rails, Blooms and Billets—
Aetna Iron & Steel Co., Bridgeport, O.

Sand and Chill Rolls—
The Lloyd-Booth Co., Youngstown, O.

Smoke Consumer—
The Breckett Smoke Consuming Co., Norwalk, O.
Jas. Sargent, Rochester, N. Y.
Northwestern Land & Coal Co., Boston, Mass.
Brightman Stoker Co., Cleveland, O.

Steel Mushet's—
B. M. Jones & Co., Boston and New York.

Stay Bolt Iron—Taylor's—
B. M. Jones & Co., Boston and New York.

Twist Drills—
Cleveland Twist Drill Co., Cleveland.
The Whitman & Barnes Mfg. Co., Akron, O.

Torches—
Rau Manufacturing Co., Chicago, Ill.

Turnbuckles—
Cleveland City Forge & Iron Co., Cleveland.

Tanks—
The Golley & Finley Iron Works, Lima, O.

Tin Plates (Roofing)—
Merchant & Co., Philadelphia, Pa.

Tinners' Hardware—
Berger Bros, Philadelphia, Pa.

Tinning Machinery—
The Lloyd-Booth Co., Youngstown, O.

Tramways—
Trenton Iron Co., Trenton, N. J.

Trucks—
The Spicer Mfg. Co., New Philadelphia, O.

Turret Drills—
A. P. Quint, Hartford, Conn.

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Brightman Stoker Co., Cleveland, O.
B. F. Sturtevant Co., Boston, Mass.

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Watchman's Time Detector.
Cleveland Electrical Mfg. Co., Cleveland, O.
A. Nanz & Co., New York City.

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The Egan Co., Cincinnati, O.

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Milton Mfg. Co., Milton, Pa.

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Radford Pipe & Foundry Co., Cincinnati, O.

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Akron Tool Co., Akron, O.

Wire Rope—
Trenton Iron Co., Trenton, N. J.

Water Stand Pipes—
Aultman, Taylor Mfg. Co., Mansfield, O.

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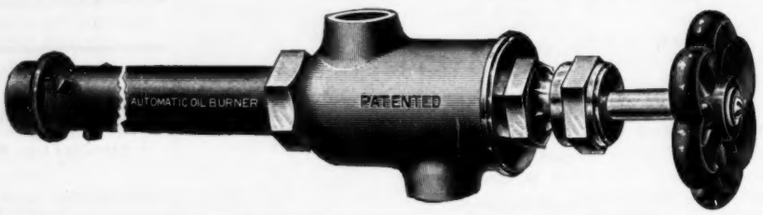
References, prices, &c., furnished on application.



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The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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IRON ORE.

Extra Low Phosphorus Bessemer	$ 5.00
No. 1 Specular, Bessemer quality	$4.50
No. 1 Bessemer hematite	$4.00@$4.25
Hematites No. 1 non-Bessemer	$3.25
No 1. Specular, Non-Bessemer	$3.50@$3.75

PIG IRON.

CLEVELAND (f. o. b. cars):

Bessemer	$13 25@$13 40
No. 1 Strong Foundry	14 25@ 14 50
No. 2 Strong Foundry	13 25@ 13 50
No. 1 Grey Forge, red short	12 35@ 12 50
No. 2 Gray Forge, neutral	12 25@ 00 00
No. 1 American Scotch	14 50@ 00 00
No. 2 American Scotch	13 50@ 00 00
Lake Superior Charcoal	17 00

PITTSBURGH (reported by A. H. Childs):

No. 1 Foundry	$14 25@$14 50
No. 2 Foundry	13 25@ 13 50
Grey Forge	12 25@ 00 00
White and Mottled	11 50@ 12 00
Warm Blast Charcoal	18 00@ 22 00
Cold Blast Charcoal	22 00@ 27 00
Bessemer	13 20@ 13 50

CHICAGO (reported by our representative:)

Lake Superior Charcoal	$16 50@$17 00
Local Coke Foundry No. 1	13 75@ 14 00
Local Coke Foundry No. 2	13 25@ 13 50
Local Coke Foundry No. 3	13 00@ 13 25
Local Scotch Foundry No. 1	14 00@ 14 50
Local Scotch Foundry No. 2	13 50@ 14 00
Local Scotch Foundry No. 3	13 00@ 13 50
Southern Coke No. 1	14 85@ 15 00
Southern Coke No. 2	13 60@ 14 00
Southern Coke No. 3	13 00@ 13 25
Southern No. 1 Soft	13 60@ 14 00
Southern No. 2 Soft	13 00@ 13 25
Ohio Silveries No. 1	16 50@ 17 00
Ohio Silveries No. 2	16 25@ 16 75
Ohio Strong Softeners No. 1	16 50@ 17 00
Ohio Strong Softeners No. 2	15 50@ 16 00
Tennessee Charcoal	16 50@ 17 00
Alabama Car Wheel	18 35@ 19 85

CINCINNATI (reported by Hyatt, Mathews & Co.):

Southern Coke No. 1, Foundry	$13 50@$14 00
Southern Coke No. 2 and No. 1 Soft	12 25@ 12 75
Southern Coke No. 3	12 25@ 12 50
Ohio Soft Stone Coal No. 1	16 00@ 16 50
Mahoning Valley No. 1	16 00@ 16 25
Mahoning Valley No. 2	15 00@ 15 25
Hanging Rock Charcoal No. 1, Fdy	18 50@ 19 50
Hanging Rock Charcoal No. 2, Fdy	17 50@ 18 00
Alabama Charcoal No. 1	18 00@ 19 00
Standard Southern Coke, Grey Forge	11 25@ 11 75
Mottled Neutral Coke	11 00@ 11 25
High Grade Virginia Coke Iron No. 1	16 25@ 16 50
High Grade Virginia Coke Iron No. 2	15 25@ 15 50
Southern Car Wheel Iron	18 00@ 18 75
Lake Superior Car Wheel & Malleable	17 50@ 18 00

BUFFALO (reported by Rogers, Brown & Co.)

Mahoning and Shenango Valley, strong, No. 1 Foundry	$15 00
Mahoning and Shenango Valley, strong, No. 2 Foundry	14 00
Ohio Softener No. 1	15 00
Ohio Softener No. 2	14 00
Jackson Co. Silvery, No. 1	$17 00@ 17 30
Jackson Co. Silvery, No. 2	16 30@ 16 80
Lake Superior Charcoal	17 25
Tennessee Charcoal	18 00
Southern Softener No. 1	13 90@ 14 15
Alabama Car Wheel	19 00
Hanging Rock Charcoal	20 50

LOUISVILLE (reported by Geo. H. Hull & Co.)

Southern Coke No. 1 Foundry	$13 00@$13 25
Southern Coke No. 2 Foundry	12 00@ 12 25
Southern Coke No. 3 Foundry	11 25@ 11 50
Grey Forge	11 00@ 11 25
Southern Charcoal No. 1 Foundry	15 00@ 16 00
Car Wheel	17 50@ 17 75

LOUISVILLE (reported by Hall Bros. & Co.):

Southern Coke No. 1	$13 5 @$13 75
Southern Coke No. 2	12 50@ 12 75
Southern Coke No. 3	12 00@ 12 25
Southern Charcoal No. 1	16 00@ 17 00
Southern Charcoal No. 2	15 50@ 16 00
Missouri Charcoal No. 1	17 00@ 17 50
Missouri Charcoal No. 2	16 50@ 17 00
Neutral Coke	11 50@ 12 00
Cold Short	11 25@ 11 50
Mottled	11 00@ 11 25
Southern (standard brands)	20 00@ 21 00
Southern (other brands)	18 50@ 19 50
Lake Superior	19 50@ 20 50

ST. LOUIS (reported by Rogers, Brown & Meacham):

Southern Coke No 1	$14 25@$14 50
Southern Coke No. 2	13 00@ 13 25
Southern Coke No. 3	12 25@ 12 50
Southern Grey Forge	12 00@ 12 25
Southern Charcoal No. 1	15 50@ 16 00
Southern Charcoal No. 2	15 00@ 15 50

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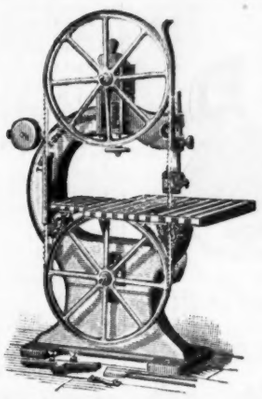

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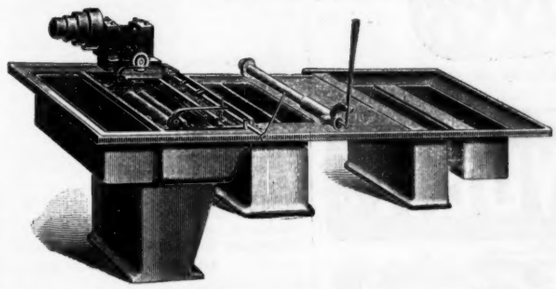
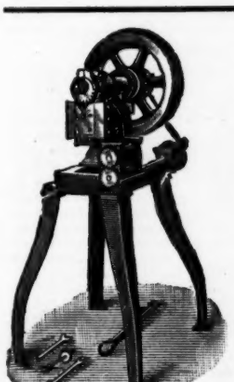


Rolling Mills, Sand and Chill ROLLS.



No. 25 Press.

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Missouri Charcoal No. 1	14 00@	14 50
Missouri Charcoal No. 2	14 00@	14 50
Ohio Softeners	16 50@	17 00
Lake Superior	18 00@	18 25
Southern	18 25@	18 50
Connellsville Coke, St. Louis		5 65

DETROIT (reported by William F. Jarvis & Co.):

Lake Superior Charcoal, all numbers	$16 50@	$17 00
Lake Superior (coke) Bessemer	15 00@	15 50
Lake Superior Coke, Foundry, all ore	16 25@	16 75
Standard Ohio Black Band	16 00@	16 50
Southern No. 1	14 50@	15 00
Southern Grey Forge	12 50@	13 00
Jackson County (Ohio) Silvery	17 50@	18 00

OLD RAILS AND SCRAP METAL.

	Gross Tons
Old iron rails	$19 00
Old steel rails	14 50
	Net Tons
No. 1 R. R. wrought scrap	$15 50
No. 1 wrought scrap	14 50
No. 1 Machine cast scrap	11 00
Iron axles	20 50
Axle turnings	12 00
Wrought turnings (free from cast)	9 50
Cast borings	6 75
Uncut wrought iron boilers	9 00
Steel boiler Plates	12 00
Grate bars	7 00
Pipes and flues (clean)	10 00
Tank iron	9 50
Hoop and band iron	8 00
Sheet iron	7 00
Wrought drillings	8 50
Malleable iron	9 00

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.90c@2.00c
Angles	1.70c@1.80c
Tees	2.30c
Universal Plates	1.70c
Sheared Plates	1.80c

MERCHANT IRON AND STEEL.

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 65
1¼ to 6 by ⅜ to 1 inch	1 70
1¾ to 6 by 1⅛ to 2 inch	1 85
1¼ & 1⅜ by ⅜ to ¼ inch	1 70
1 & 1⅛ by ⅜ to ¼ inch	1 75
⅝, ⅜, ⅞, by ⅜ to ⅝ inch	1 85

Round and Square.

1 to 1⅞ inch	1 65
2 to 2⅝ inch	1 75
2¾ to 3¼ inch	1 90
3⅜ to 4 inch	2 15
4¼ to 4½ inch	2 75
4¾ to 5 inch	3 00

Oval.

⅞ to 1¼ inch	1 85
⅝ to ¾ inch	1 85
½	2 05
⅜	2 25

Half Oval and Half Round.

1¼ to 3 inch	2 20
⅞ to 1½ inch	2 00
⅝ to ¾ inch	2 25
½	2 40
⅜	3 50

Heavy Band.

1¼ to 6 by ¼ and 5 16 inch	1 75
1 to 1⅜ by ¼ and 5-16 inch	1 80
¾ to ⅞ by ¼ and 5-16 inch	1 90
½ to ⅝ by ¼ and 5-16 inch	2 15

Hoops.

1¼ to 4, Nos. 13 to 15	2 40
1¼ to 2, Nos. 16 to 18	2 45
1¼ to 2. No. 19	2 50
1¼ to 2, No. 20	2 50
1¼ to 2, No. 21	2 60
1¼ to 2, No. 22	2 70
15-16, 1 and 1⅛, Nos. 13 to 15	2 45
15-16, 1 and 1⅛, Nos. 16 to 18	2 50
15-16, 1 and 1⅛, Nos, 19 and 20	2 60
15-16, 1 and 1⅛, No, 21	2 70
15-16, 1 and 1⅛, No. 22	2 80
⅞, Nos. 13 to 15	2 60
⅞, Nos. 16 to 18	2 70
⅞, Nos. 19 and 20	2 80
⅞, No. 21	2 90
⅞, No. 22	3 00
13-16, Nos. 13 to 15	2 70
13-16, Nos. 16 to 18	2 80
13-16, Nos. 19 and 20	2 90
13-16 No. 21	3 00
13-16, No. 22	3 10
¾, Nos, 13 to 15	2 80
¾, Nos. 16 to 18	2 95
¾, Nos. 19 and 20	3 05
¾, No. 21	3 15
¾, No. 22	3 25
11-16, Nos. 13 to 15	3 05
11-16, Nos 16 to 18	3 10
11-16, Nos. 19 and 22	3 20
11-16, No. 21	3 30
11-16, No. 22	3 40
⅝, Nos. 13 to 15	3 10
⅝, Nos. 16 to 18	3 20
⅝, Nos. 19 and 20	3 30
⅝, No. 21	3 40
⅝, No. 22	3 50
⅝, No. 23	3 60

Light Band.

1½ to 6 by ⅛ to 3-16 inch	1 95
1½ to 6 by Nos. 11 and 12	2 00
1 to 1⅜ by ⅛ to 3-16 inch	2 00
1 to 1⅜ by Nos. 11 and 12	2 05
⅞ and 13-16 by ⅛ to 3-16 inch	2 15
⅞ and 13-16 by Nos. 11 and 12	2 20

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PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.

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Lanterns, Etc.

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Platform, 90" long, 27¾" wide; made of best seasoned hickory, with slat top. Weight, 350 pounds. For particulars address

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Capacity, 2½ tons.

Especially adapted for Tin Plate, Sheet Lead, Sheet Iron and Steel.

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SEND FOR DESCRIPTIVE PAMPHLET.

Stump before a blast. | Fragments after a blast.

STRONGEST and SAFEST EXPLOSIVE Known to the Arts.

POWDER, FUSE, CAPS, Electric Mining Goods,

AND ALL TOOLS FOR STUMP BLASTING, FOR SALE BY THE

HERCULES POWDER COMPANY, 40 Prospect Street, Cleveland, Ohio. I. W. WILLARD, Manager.

¼ and 11-16 by ⅛ to 3-16 inch.....2 25
¼ and 11-16 by Nos. 11 and 12.....2 30
⅜ and 9-16 by ⅛ to 3-16 inch.....2 40
⅜ and 9-16 by Nos. 11 and 12.....2 45
½ by ⅜ to 3-16 inch.....2 55
½ by Nos. 11 and 12.....2 60

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12.....2 20
⅞ inch, " " " " 13 and 14.....2 30
¾ inch, " " " " 11 and 12.....2 35
¾ inch, " " " " 13 and 14.....2 55

Sheet Iron.

No. 10 to 14.....2 30
No. 15 to 17.....2 45
No. 18 to 21.....2 60
No. 22 to 24.....2 70
No. 25 to 26.....2 80
No. 27.....2 90
No. 28.....3 55

Iron Boiler Plates.

Tank, ¼ inch and heavier.....2 25
C No. 1, " " 2 40
C H No. 1, " " 2 50
C H Flange, " " 3 50
Extra Flange " 4 00
Solid Fire Box " 4 75

Steel Boiler Plates—1-4 in. and Heavier.

Tank.....2 25
Shell.....2 50
Flange.....2 75
Marine Flange.....3 00
Fire Box.....4 00
Above includes plates 90 inches wide.
90 to 96 in. wide.....½c. lb. extra
96 to 100 in. wide.....1 c. "
100 to 104 in. wide.....1½c. "
104 to 116 in. wide.....special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	08
9-16 to ½ in. "	08½
7-16 to ⅜ and 2⅜ to 3 in	09
3⅛ to 4 in	09½
⅝ to 11-16 and 4½	10
⅛ to 6 in	10½
¼ to 9-32 and 6⅛ to 7 in	11
3-16 in	13

Flats.

	cts. lbs.
2 to 9-16 in. wide by 2 to ⅝ thick	8

Bessemer and O. H. Steel.

Machinery.....base price, 2 35
Tire..... " 2 25
Spring..... " 2 80
Sleigh Shoe..... " 2 50
Toe Calk..... " 2 35
Cutter Shoes, tapered and bent..... " 2 75

English Tool Steel.

Jessop's.....15½c
Hobson's "Best".....15½c
" "Choice".....35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter.....4 00
Bridge ½, ⅝, 11-16 and ¾ inch diam.....4 00

MACHINERY SUPPLY MARKET.

Anvils.

American.....⅌ lb 9@10
Wright's.....⅌ lb 12

Bellows.

Blacksmiths' { Hill's.....dis 40 / Bullock's.....dis 50&10
Moulders'.....dis 40@40&10
Hand.....dis 40&10@50

Belting.

Boston Belting Co.'s standard.....dis 70
" " " extra.....dis 60&5
" " " best.....dis 55
Cleveland Rubber Co. extra standard.....dis 60&10
Hoyt's Short Lap.....dis 45
Shultz Raw Hide Leather Belting, single,.....dis 40
Munson's Short Lap Single Leather.....dis 45
Munson's Short Lap Double and Light Double Leather.....dis 50
Shultz Raw Hide Leather Belting, Double and Light Double.....dis 40
Standard, oak tanned.....dis 50&10
Alexander Brothers' pure oak tanned.....dis 45

Blowers and Exhausters.

B. F. Sturtevant's.....dis 20
Boston Blower Co.,.....dis 35
Buffalo.....dis 40

Chucks.

Cushman's 4 Jaw Independent.....dis 45
" Combination.....dis 40
" Geared Scroll.....dis 30
" 2 Jaw Brass Workers.....dis 30
" Drill.....dis 35
Wescott's Scroll Combination.....dis 33⅓
" Independent.....dis 40
" Little Giant Drill.....dis 30
Horton's Universal.....dis 40
" Independent.....dis 45
Whiton's Independent.....dis 45
National Combination.....dis 40
Sweetland " .....dis 40
Almond Drill.....dis 20
Morse " .....dis 15
Skinner's Combination Lathe.....dis 40&10
" Independent Lathe.....dis 40&10
" Universal Lathe.....dis 40&10
" Drill.....dis 35

Cutters and Reamers.

Cleveland.....dis 10@15
Pratt & Whitney.....dis 10@15
Standard.....dis 10@15

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AND WINCHELL'S

"IRON ORES OF MINNESOTA."

Their Geology, Discovery, Development, Qualities, and Origin and Comparison with those of other Iron Districts. With a Geological map, 26 Figures, and 44 plates, 430 pages octavo, good cloth binding.

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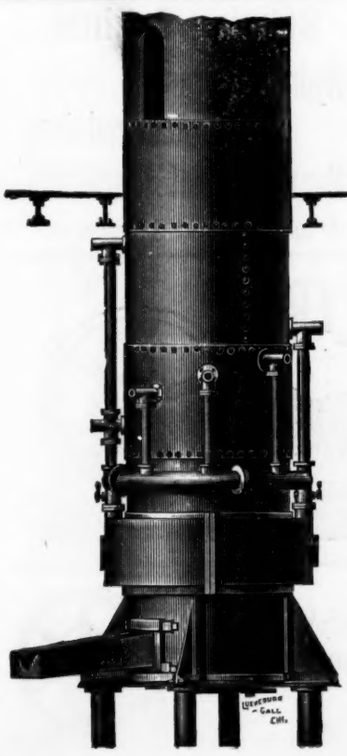

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Brown & Sharpe, Milling Cutters.....dis 15
" " Gear Cutters.....dis 15

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Cast Steel.....℔ lb 3½
Iron, steel points.....℔ lb 3½

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Twist Drills.....dis 50&10
Morse Taper and Straight Shank to 1½".dis 50&10
Morse Taper and Straight Shank Larger than 1½".....dis 25
Drill Sockets.....dis 25
Standard Twist Drills.....dis 55@55&5
Cleveland " " .....dis 55@55&5

Emery.

	No. 4 to No. 54 46 gr.	150 gr.	Flour, C. F. F. FF.
Kegs, ℔ lb	4½c	5 c	2½c
½ kegs ℔ lb	4¾c	5¼c	2¾c
¼ kegs ℔ lb	5 c	5½c	3 c
10 lb cans, 10 in case	6 c	6¼c	5 c
10 lb cans, less than 10	10 c	10 c	7½c

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Barder, Adamson & Co.....dis 50@50&5
H. H. Barton.....dis 50@50&5

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Detroit.....dis 55@60
Norton's.....dis 55@60
Grant.....dis 55@60
Sterling.....dis 60
Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
Vitrified.....dis 60
Vulcanite.....dis 60&10
Hamden.....dis 60&10
Cyclone.....dis 60

Files.

Arcade.....dis 60&10@60&10&10
Nicholson.....dis 60&10@60&10&10
" X. F.....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
McClellan.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
Industry File Works, Hand Cut.....dis 50

Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs.....15c
" " " " over 5 lbs.....12c

Jack Screws.

Illinois Bolt Co. list.....dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3¾	3½
Hexagon	15½	11½	8½	6	5¼	5¼	5
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ℔ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887.....dis 75
Standard Penny Nails, ℔ keg card rate
{ Car lots.....$1.50
{ Less than car lots...$1.60

Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $3.60: No. 2, $4.00; No. 3, $4.40 ℔ doz.....dis 10@10&10

Packing, Steam.

Boston Belting Co.....dis 60
American Packing Hemp.....℔ lb 9@10
Russia " " .....℔ lb 14
Italian " " .....℔ lb 13@19
Plumbago Piston.....℔ lb 40
Peerless.....℔ lb 60
Morrison's " .....℔ lb 50
Square Flax " .....℔ lb 50
Sheet Rubber.....℔ lb 12&24
Excelsior Rubber.....℔ lb 48
Rainbow.....{ Full Rolls.....50c ℔ lb
{ Less than Full Rolls, 60c ℔ lb
Eclipse Gasket.....℔ lb 75

Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 40
Medart Pulleys.....dis 50
Split Wood Pulleys.....dis 50@55

Rivets.

Iron, Thousand, list November 17.....dis 50@50&10
Iron, Ordinary, Cooper's Block and Carriage list November 17.....dis 50@50&10
Copper.....dis 50@50&10

Saws.

Disston's Circular.....dis 40&10
" Band.....dis 25
" Scroll.....Net
Hack Saw Stubs.....dis 20
" " Eureka.....dis 20
" " Star.....dis 20
Saw Swages Diston's.....dis 30
Atkins' Circular Saws.....dis 40&45
" Mill, Mulay and Drag Saws.....dis 40&10
" Wood Saws.....dis 40&10
" Silver Steel Diamond Cross-cut Saws.....70c per ft
" Dexter Cross-cuts.....50c "
" Diamond " .....30c "
" Tuttle Tooth Cross-cuts.....25c "
" One-man Cross-cuts.....32c "

No. 1 Handles	23c per pair
No. 6 "	16c "
Excelsior Saw Tools	$6 per doz
Perfection "	$15 "
Detroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2¼ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Jan. 18, 1884

Brass	dis 30
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₩ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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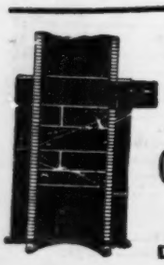

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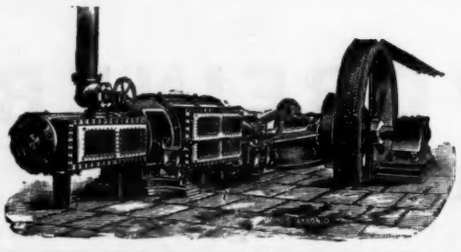
SINGLE, COMPOUND & CONDENSING



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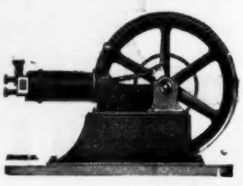

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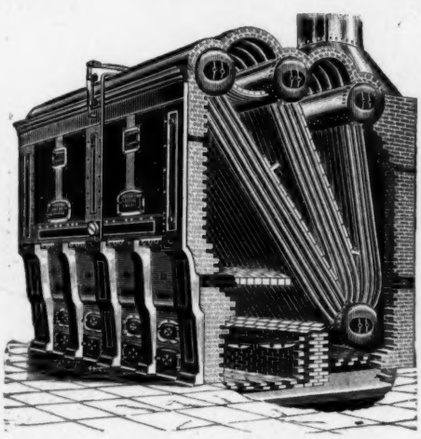

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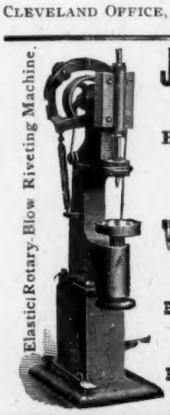

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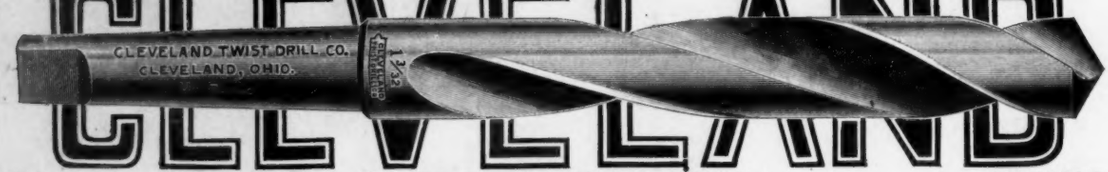

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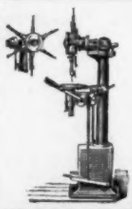

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